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AIR CORPS "TECH" SCHOOL

AIR CORPS NEWS LETTER

SPECIAL EDITION OF THE AIR CORPS TECHNICAL SCHOOL, CHANUTE FIELD

ISSUED BY
THE OFFICE OF THE CHIEF OF THE AIR CORPS
WAR DEPARTMENT
WASHINGTON

VOL. XX NOV. - 1 - 1937 NO. 21

Foreword

The great progress that has been attained in the past few years in the technical field of aviation, particularly in its application to military purposes, has been accompanied by an ever increasing demand for trained specialists, not only in the mechanical operation of the airplane , but also in its purely military appurtenances. To meet this demand the meager facilities of the Air Corps Technical School have been expanded in a short time to such an extent that the annual output of such trained specialists has been increased from approximately 200 to 1000. Although plans are now being studied toward further expansion in the form of a branch school now being surveyed in Denver, Colorado, the resultant increase will still be inadequate to meet the requirements of the Air Corps, which requirements will be measured, not in hundreds, but in thousands.

The compendium is an effort to depict graphically what has already been accomplished and to stimulate the interest and cooperation of the entire Air Corps toward the realization of the true mission of the Air Corps Technical School. This mission will be realized when the standard of technical training of the Air Corps is raised to such a degree that accidents resulting from errors in technical operation are practically unknown.

James W. Jones

Junius W. Jones, Lieut.Colonel, A.C., Commandant

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Born Louisiana April 3, 1890. Appointed Military Academy March 1, 1909. Appointed 2nd Lt. Coast Artillery Corps June 12, 1913. 1st Lt. July 1, 1916. Captain June 27, 1917. Air Service July 1, 1920. Major July 1, 1920. Transferred to Air Service November 25, 1921. Colonel (temporary) March 2, 1935. Lt.Col. August 1, 1935. Relieved Colonel (temporary) June 6, 1936. General Staff Corps Eligible List. Graduated Army War College 1930; Command and General Staff School 1929; Air Service Pilots School 1920; Air Service Observation School 1921; Air Corps Tactical School 1928; Naval War College 1934. Rated Airplane Pilot and Airplane Observer. Commandant, Air Corps Technical School, August 20, 1934.

Earle G. Harper, Major, Air Corps, Assistant Commandant

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Born Ohio Feb. 3, 1890. Appointed from California. 1st Lt. Aviation Section Sig.O.R.C. Nov. 8, 1917. Accepted Nov. 14, 1917. Active duty Nov. 14, 1917. Capt. A.S.Nat.Army June 26, 1918. Accepted July 6, 1918. Vacated Sept. 15, 1920. 1st Lt. Infantry July 1, 1920. Transferred to Air Service October 26, 1920. Captain August 11, 1928. Lt.Col. (temporary) March 16, 1935. Major (temporary) June 16, 1936. Major October 1, 1937. Graduate Air Service Pilots School 1921; Air Service Observation School 1921; rated Airplane Pilot and Airplane Observer. Assistant Commandant, Air Corps Technical School, Sept. 22, 1934.

THE AIR CORPS TECHNICAL SCHOOL

HISTORY

The Air Corps Technical School, first known as the Enlisted Mechanics Training Department, was organized at Kelly Field, Texas, about October 1, 1917. Operating in tents and with inadequate equipment, very little was accomplished from October through December of that year.

Reconstruction of the school was started in January, 1918, resulting in improved conditions due to better housing facilities, more and better school equipment, and an adequate supply of text and reference books. Graduates of the school assigned to the various squadrons were found, to the surprise of all concerned, to be very valuable as airplane mechanics; this was sufficient cause to warrant the expansion of the school. Additional courses were incorporated and a short time later the name was changed to the Air Service Mechanics' School and it became a permanent organization of the Air Service.

The school was moved from Kelly Field, Texas, to Chanute Field, Rantoul, Illinois, in January, 1921. Some idea of its development may be gained from the fact that it required ninety freight cars to move the equipment to the new station.

The Photographic School at Langley Field, Virginia, and the Communications School at Post Field, Oklahoma, were transferred to Chanute Field in 1922 and incorporated with the Air Service Mechanics' School. Shortly afterwards, the name was changed to the Air Corps Technical School, its present designation.

FUNCTION

The principle function of the Air Corps Technical School is to supply the Air Corps with highly trained technicians for the maintenance of Air Corps equipment, correspondence and records. Students of the Air Corps Technical School receive a standardized form of training based on the essential requirements of Air Corps commissioned and enlisted personnel.

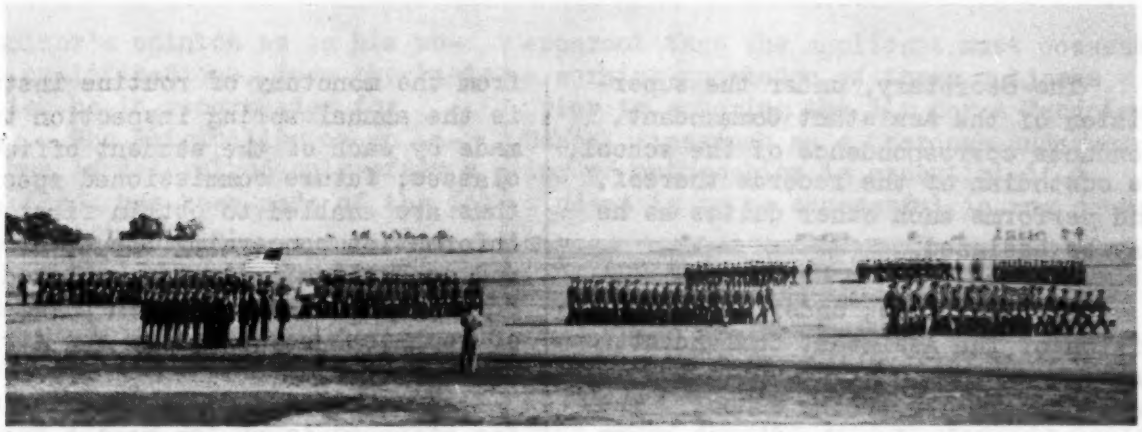
ORGANIZATION

The Air Corps Technical School is under the direct supervision and control of the Chief of the Air Corps. It is composed of six departments, namely, the Department of Mechanics, the Department of Armament, the Department of Photography, the Department of Communications, the Department of Basic Instruction, and the Department of Clerical Instruction.

The personnel of the school consists of the Commandant, school staff, and such student officers and enlisted men as may be enrolled for a course of instruction.

The Commanding Officer of Chanute Field is also the Commandant of the Air Corps Technical School, and is especially selected for this duty by the War Department. He has charge of general school administration and is responsible for all matters of instruction therein.

The Assistant Commandant is also selected by the War Department; under supervision of the Commandant he has charge of instruction and administration in the school. He has general charge of the preparation of training literature and such additional data as may be required to carry out the training program.



After 30 years service a review in honor of retirement of First Sergeant Edwin Booth, and presentation of a gold watch by his organization commander, Major E.G.Harper, AC.

The Secretary, under the supervision of the Assistant Commandant, conducts correspondence of the school, is custodian of the records thereof, and performs such other duties as he may be assigned.

The Directors, under the supervision of the Assistant Commandant, have charge of instruction in the various departments of the school. They are responsible for the direct supervision of the preparation of courses and instructional matter of their respective departments.

The Faculty Board consists of the Commandant, the Assistant Commandant, Secretary, and such Directors, Senior Instructors and Instructors as may be designated. It acts upon such matters relative to the school as may be referred to it by the Commandant and determines all matters relative to standing, rating or classification, proficiency or deficiency of students.

INSTRUCTION

The applicatory method of instruction is used throughout the Air Corps Technical School. A proper balance is maintained between classroom lectures and recitations, and shop and laboratory work. Practical jobs and exercises, representative of situations likely to be encountered in the service, are assigned to each student, who is encouraged to develop proper habits of work and to master all details of technique in accomplishing each job. Lectures are presented with the aid of physical and graphical demonstrations whenever such teaching devices may be used to advantage. The classroom work of officer classes is occasionally supplemented by lectures given by representatives of the Materiel Division. A welcome relief from the monotony of routine instruction is the annual spring inspection trip made by each of the student officer classes; future commissioned specialists thus are enabled to obtain first hand information concerning the development and production processes employed by government and industry in the manufacture of technical material for the Air Corps.

The Maintenance Engineering course for officers is of ten months duration, beginning in September; Armament, seven months beginning in December; Photography, nine and one-half months beginning the middle of September, and Communications, nine months beginning the first of October.

The classes of enlisted men are staggered in accordance with an approved time schedule to enable the several departments to accommodate classes of from eight to thirty men in the most efficient manner possible. The instructors are thus enabled to give individual attention to each student. Students are graded daily on proficiency and are given an academic or examination grade after each examination, or at the end of each phase and course. Those students who fail two of the prescribed subjects are ordered to appear before the Faculty Board where the cause of the failure is determined and recommendation is made on the disposition of the student. The number of failures are few, since each enlisted student is carefully classified by the Trade Test Department prior to entering the school. The functions of this department are very similar to those of an employment department of a large corporation. Each applicant must have certain specific qualifications for entering any particular course. By the use of intelligence tests, study of personal record and a personal interview, the general qualifications of each applicant are determined. This, together with his interest, desire, age, alertness, and

the examiner's opinion as to his potential qualifications, form the basis upon which he is recommended for training. The eligibility of an enlisted man is determined only after a careful check has been made of the following qualifications:

1. Education:
   a. Public and High School;
   b. Higher, Technical or Trade Schools;
   c. Nature of courses elected while a student;
   d. Grades, or relative standing in mathematical or scientific courses;
   e. Army Schools attended.

2. Work History in Civilian Life:
   a. Trade followed, if any;
   b. Nature of jobs held, duties entailed, length of service, advancement, etc.

3. Army Service:
   a. Length of service;
   b. Principal duties since entering the service.

The Trade Test Department assembles the above information by the use of a comprehensive application blank, and subsequent verification through former employers and school activities.

The entrance examinations consist of the following:

1. Mathematics Tests:

These cover all phases of work in grammar school arithmetic (fractions, decimals, ratio, proportion and square root), elementary algebra, and geometry. When it is considered that in the Department of Basic Instruction only seven days are allotted to the teaching of shop mathematics, it is apparent that the applicant must possess a working knowledge of these subjects prior to entering the Air Corps Technical School, inasmuch as a thorough understanding of mathematics is essential if a student is to be successful in any course.

2. Aptitude Tests:

These are fundamental tests in Elements of Electricity, Shop Work, Knowledge and Use of Simple Hand Tools, Blue Print Reading, and such other tests as might be necessary to determine the technical qualifications or mechanical aptitude of an applicant for a course of study. These tests determine with equal success the aptitude of either the inexperienced high school graduate or the service man with training and experience of a technical nature.

3. Intelligence Tests:

The Army Alpha has been used in this school for many years, and is modified at regular intervals to keep its context from becoming out of date. It is so designed that it will furnish the necessary information to determine whether or not an individual is sufficiently alert mentally to assimilate, in the time available, the instruction given. A similar form of mental test is used in most of the high schools and colleges throughout the country, and has recently been adopted by many large industries as an aid in the selection of young men for apprentice training. Previous education and experience of the individuals tested have an important bearing on the test results.

4. Interview:

Upon his arrival at the school, each applicant is given a personal interview at which time it must be evident that he has sufficient interest in Radio, Mechanics, or any other course selected

so that he will carry his work to a successful completion. The progress of each Air Corps, Chanute Field (unassigned) student is carefully observed while undergoing the four weeks of basic instruction to determine further his aptitude, adaptability, and qualifications for the course which he has selected. Occasionally it is advisable after checking his progress in various phases of Basic Instruction, to transfer a student to a course for which he is better suited.

GENERAL

To be graduates of one or more of the courses given at the Air Corps Technical School is the hope of the ambitious enlisted men of the Air Corps. It supplies them with the necessary technical knowledge to pass successfully technical examinations for Air Corps promotions.

The advantages of a course of instruction in this school are not only appreciated by those in the service, but also by those who have not had previous military experience, but who have learned of the school and the different courses offered. A priority list of civilian applicants for the Air Corps Technical School is maintained by the Trade Test Division. After enlistment, and upon completion of five weeks' recruit instruction, applicants are interviewed by the trade test examiner and detailed as students in courses for which they are best qualified. During the period covered by recruit instruction and the period of attendance at school, these students are carried as "Air Corps, Chanute Field," and are continued as such until their graduation when they are assigned by the Chief of the Air Corps to Air Corps stations.

Entrance requirements for officers and enlisted men of the Regular Army Air Corps are contained in Army Regulations 350-540 and Circular 35-7, Office, Chief of Air Corps.

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Mr. R. W. Faubian, Senior Instructor of the Trade Test Division, has just decided that Pfc. W. C. Ahrens of Selfridge Field is eligible for a course of instruction at the Air Corps Technical School.

THE DEPARTMENT OF BASIC INSTRUCTION

Captain Narcisse L. Cote, Air Corps, Director.

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Perhaps you haven't heard of the Basic School in connection with the Air Corps Technical School? What you are mainly interested in when you think of Chanute Field is one of the technical courses taught there and the advantages to be gained in being a graduate of one of those technical courses.

It was discovered some time ago that it was rather difficult for some men to grasp even the simplest theories and formulae that are the basis upon which any technical subject is founded, particularly so when it had been some time since they had been to high school. Theories and facts of an abstract nature are easily forgotten unless they are brought to mind time and again until they become a habit of the mind through practical application.

Then too, although the prospective student may have handled tools of all kinds either in civilian life or in the Air Corps, he may never have learned the correct names of those tools or how to use them to best advantage so that the job each tool was made to do is done with that tool and done in such a manner that any other tool would not have done the job as well. The tools the Air Corps mechanic is mainly interested in are those used in connection with metalwork.

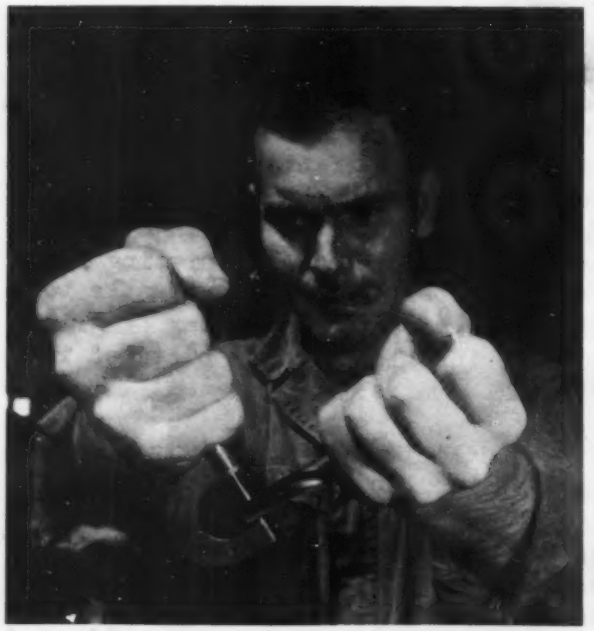
To those who make no use of them, blueprints and mechanical drawings may seem to be a mysterious jumble of lines, but to the mechanic, they are the written language of his work. Every Air Corps mechanic should be able to make simple mechanical drawings and should be capable of interpreting from a blueprint so that he may be able to follow the circuits of wiring diagrams and make installations as pictured in technical orders.

Electricity, it seems, is a major consideration in any technical subject. Almost every craftsman must use it in one form or another, the Air Corps technician should certainly understand the basic laws of electricity before he attempts to master the more complicated machines and defices connected with his trade specialty.

The School of Basic Instruction seeks to give the student an insight into all of these things in the very short space of four weeks that are allotted to that section of the school. You see, the idea is not to present added subjects to the student and thereby increase his work and make it more difficult for him to graduate; indeed, the opposite is true. The Basic School course is intended to make the technical courses easier for the student.

It is more or less a refresher course covering the high points of his high school work; bringing back to mind things that he once knew well, but has forgotten because of not having heard or used that knowledge over a period of time.

Nothing new or complex is presented in the course that the average high school graduate cannot grasp readily. Only the very basic elements of Shop Mathematics, Electricity, Tools and Metalwork, and Mechanical Drawing and Blueprint Reading are taught. The subjects are taught not

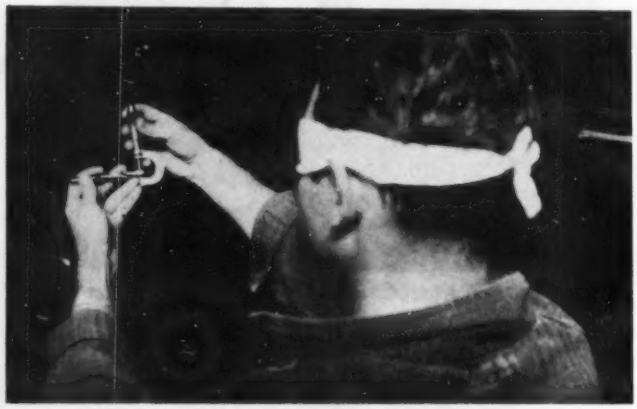


"Honest, my hands felt that big when I started to use a micrometer", says Pvt. A. H. Dell of Barksdale Field..

with the idea of giving the students mere abstract knowledge to remember, but rather to give him a practical mental and workmanlike base to stand on in his future courses.

Don't get the idea that most of the work in the Basic School is study and lecture either. Only one-eighth of the time is spent in the classroom. All the rest of the time the student is in the laboratory or shop putting that classroom knowledge to work and demonstrating to himself the 'hows' and 'whys' of what he has learned.

A long time ago the directors of the various courses pursued at the Technical School realized that some sort of basic instruction was an essential preliminary to the training in any of the technical subjects and so, one by one, each course instituted its own basic instruction. To more readily standardize this work, it was later decided to group all the basic schools together in-



...."But heck, I can do it blindfolded after that course".

asmuch as the separate schools had all taught practically the same things. So now, we have the one course of basic instruction.

The whole purpose of the Basic School is to help the prospective student remember what he has forgotten and to get him started on the right foot for his technical schooling.

The Trade Test Division is that section of the Basic School which decides, even before the student starts whether or not he is capable of completing one of the courses at the Technical School. This section is also responsible for the make-up and marking of the

Pfc. T. A. Schild, Senior Instructor in Shop Mathematics says, "Now, if : three-fifths as many oranges as ....."

.....and Pvt. E. A. Crumley of Langley Field decides on a practical demon stration.

eligibility examinations taken for entrance to the Technical School. These examinations together with the tests for mental alertness given on arrival at the school form a valuable index of the student's capabilities and possibilities.

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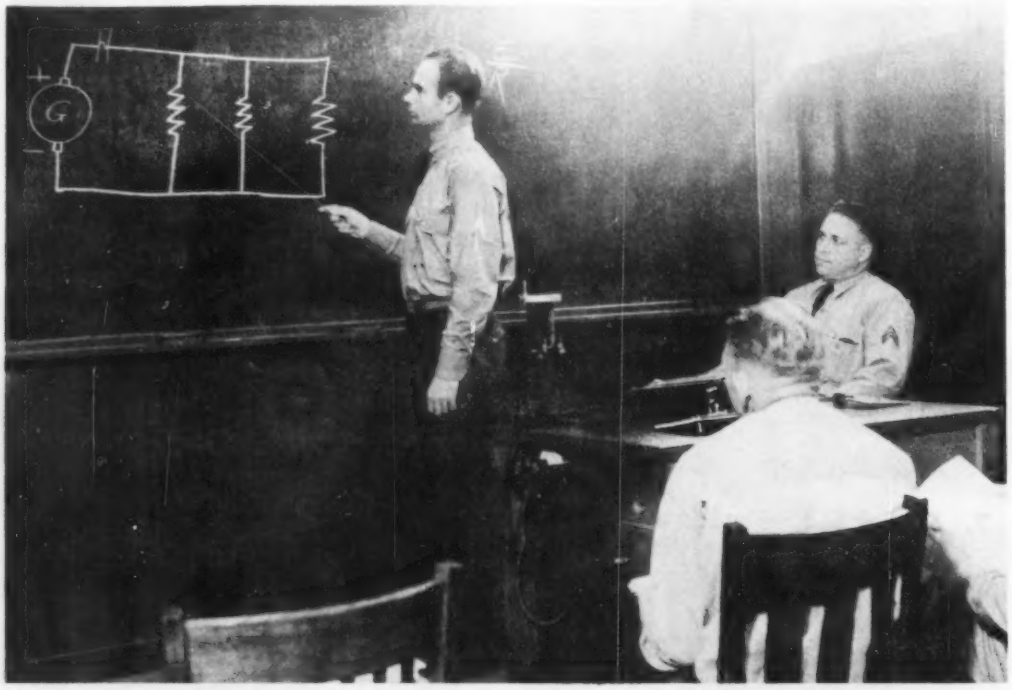
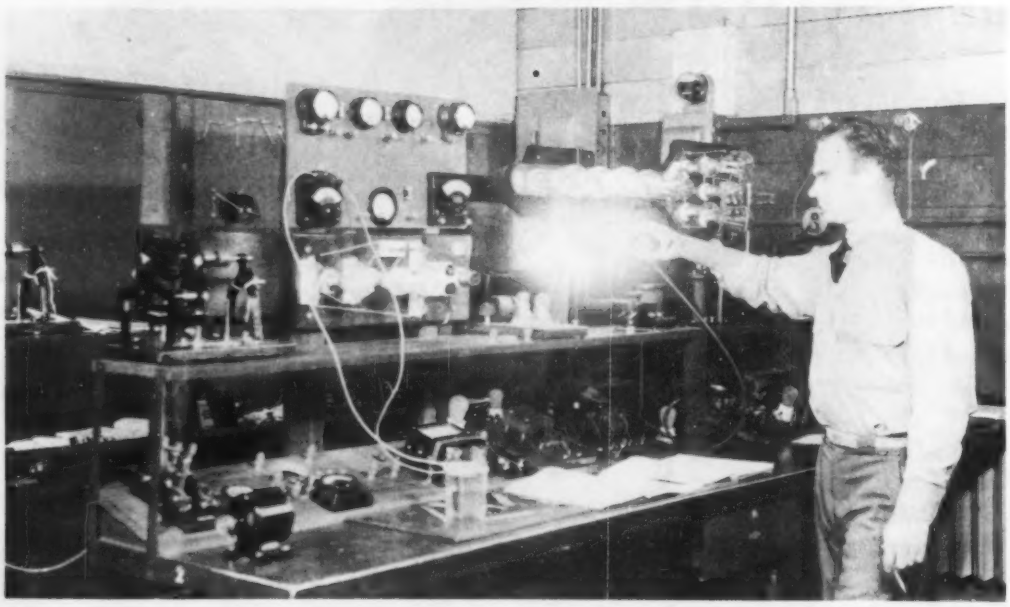


.....now it's Corp. Story's turn to tell about parallel circuits.....



....and finally, he constructs a circuit in parallel in the laboratory. He won't forget what a parallel circuit is.

DEPARTMENT OF MECHANICS

Major William M. Lanagan, Air Corps, Director.

It is the function of the Department of Mechanics, Air Corps Technical School, to train officers and men in the various trade specialties involved in the operation, maintenance and repair of all types of military aircraft.

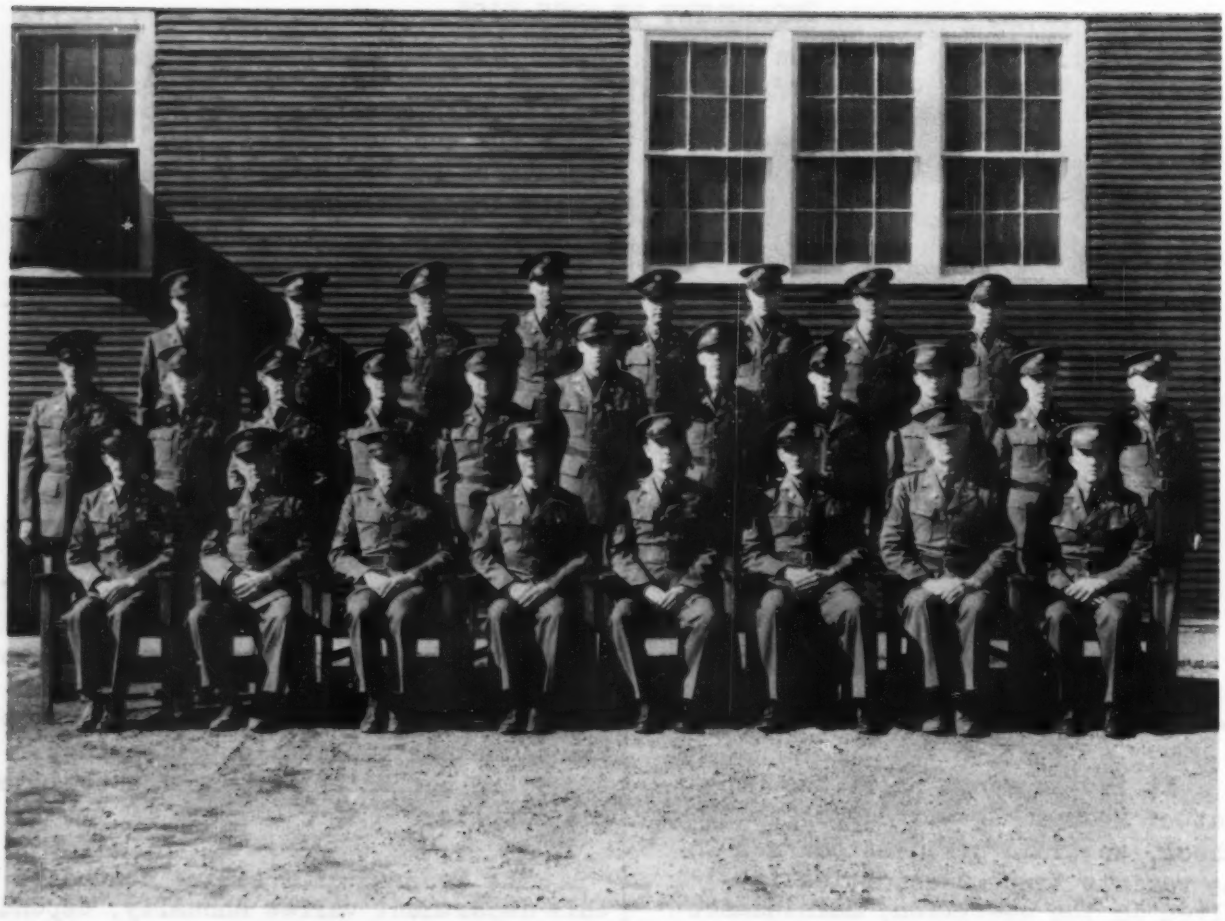
The general organization of the department is somewhat similar to that of the Engineering Department of an Air Depot. A central office maintains all records and reports and handles all administrative matters; whereas, the school buildings and actual instruction is divided into four (4) sub-departments or divisions namely: Airplane Division, Power Plant Division, Machine Shop Division and Parachute Division, the details of which are defined in subsequent articles. The personnel of the department consists of four (4) officers, approximately thirty (30) enlisted men and twenty (20) civilian instructors.

The applicatory system of instruction is practiced in so far as possible, therefore the school rooms consist primarily of shops and laboratories with merely sufficient class rooms for conducting lectures, demonstrations and examinations. Approximately three-fourths of the total time allotted for instruction is devoted to actual work in the shops and laboratories and one-fourth to class room instruction. The percentage of class room instruction for officers' courses is necessarily somewhat higher than this. The nature of work conducted in the shops and laboratories consists of approved methods of repair, adjustment, test, and operation of various aircraft units; whereas, the class room instruction consists of the principles of construction and operation of these units and the reasons for performing work as prescribed. Class room instruction also includes the application and use of all technical publications, drawings, etc., and mechanics of handling equipment and supplies.

The Program of Training conducted by this department varies annually, depending upon the needs of the service. During the ensuing school year a total of approximately fifteen (15) officers and six hundred and fifty (650) enlisted men will be trained in nine (9) different courses, a brief outline of which follows:

1. Airplane Maintenance-Engineering Course.- a. Purpose. To instruct and train officers in the construction principles, repair, maintenance, and inspection of airplanes, airplane engines, and auxiliary appliances; the operation, repair and maintenance of shop and hangar equipment; and in the duties of an Air Corps Engineering Officer.

b. The duration of this course is ten months long and includes instruction in Machine Shop Practice; Metal Shop Practice; Airplane Construction and Repair; Airplane Propellers; Airplane Instruments; Engine Construction and Repair; Airplane Electrical Systems; Engine Induction Systems,



Enlisted Personnel, Department of Mechanics

Front Row - Left to Right: Sgt. S.H. Bishop, Instr. Parachutes; S.Sgt. E. J. McClellan, Instr. Dope & Fabric; S.Sgt. W.M. Grady, Instr. Airplane Repair; M.Sgt. G.P. Stanaland, Sr.Instr. Parachute Div.; M.Sgt. O.K. Lee, Instr. Airplane Repair; S.Sgt. L.T. Burval, Instr. Welding; S.Sgt. G.A.L. Genoway, Chief Clerk; S.Sgt. B.H. Litten, Parachute Rigger.

Middle Row - Left to Right: Sgt. F.J. Leonard, Instr. Airplane Inspection; Pvt. J.E. Ball, Instr. Sheet Metal; Corps. D.E. Erwin, Instr. Ignition; Corp. L.E. Mayea, Instr. Sheet Metal; Sgt. H. Anderson, Parachute Rigger; Sgt. G.E. Cain, Instr. Ignition; Corp. V.E. Botkin, Supply; Sgt. F.W. Leary, Instr. Carburetion; Sgt. C.P. Hamilton, Instr. Carburetors; Pvt. H.P. Robbins, Clerk; Pvt. F.V. Garbich, Instr. Ignition.

Rear Row - Left to Right: Corp. E.H. Farr, Instr. Propellers; Pvt. C.H. Short, Instr. Engine Testing; Pvt. W.F. Gorsage, Machinist; Pvt.1cl J.F. Holliday, Instr. Machinist; Pvt. B.L. Minton, clerk; Pvt.1cl G.F. Tate, Instr. Instruments; Pvt. M. A. Zeiger, Instr. Airplane Inspection; Pvt. R.C. Moore, Clerk.

Fuels and Lubricants; Engine Operation and Testing; Airplane Assembly; Parachutes; Airplane Maintenance and Inspection; Air Corps Maintenance-Engineering System; Auxiliary Equipment Installations and Inspection Trips, and Instructions in Preparation of Efficiency Reports. Total number of hours: 1266.

2. Airplane Mechanics' Course.- a. Purpose: To train enlisted men in the general construction principles, minor repair, adjustment, inspection and maintenance of the complete airplane, engine, and affiliated equipment; also the care and use of material, tools and equipment used in the hangar.

b. The duration of this course is twenty weeks for assigned men, and twenty-four weeks for unassigned men. The course includes instruction in Airplane Construction and Repair; Airplane Propellers; Airplane Instruments; Engine Construction and Repair; Airplane Electrical Systems; Engine Induction, Fuels and Oil Systems; Engine Operation and Test; Airplane Assembly, and Airplane Inspection and Maintenance. In addition, unassigned men receive four weeks additional instruction in the Department of Basic Instruction. Total number of hours: Assigned Men, 600; unassigned men, 720.

3. Aircraft Machinists' Course.- a. Purpose: To instruct and train selected enlisted men in general machine work, forging and heat-treating.

b. The duration of this course is twenty weeks for assigned men, and twenty-four weeks for unassigned men. The course includes instruction in Lathes; Milling Machines and Shapers; Forging and Heat-Treating, and Grinding Machines. Unassigned men receive four additional weeks instruction in the Department of Basic Instruction. Total number of hours: Assigned men, 600; unassigned men, 720.

4. Aircraft Welders-Sheet Metal Workers Course. - a. Purpose: To instruct and train selected enlisted men in oxy-acetylene welding, construction and repair of metal aircraft structural units, aircraft sheet metal work and radiator repair.

b. The duration of this course is twenty-four weeks for assigned men, and twenty-eight weeks for unassigned men. This course includes instruction in Basic Sheet Metal Work; Airplane Metal Work; Heat-Treating; Basic Welding and Aircraft Welding. Unassigned men receive four additional weeks instruction in the Department of Basic Instruction. Total number of hours: Assigned men, 720; unassigned men, 840.

5. Parachute Riggers Course. - a. Purpose: To instruct and train selected enlisted men in the construction, repair, maintenance, and inspection of parachutes and parachute equipment used by the Air Corps.

b. The duration of this course is eight weeks, and includes instruction in Parachute Construction and Repair and Parachute Maintenance and Inspection. Total number of hours: 240.

6. Propeller Specialists' Course. a. Purpose: To train especially selected enlisted men in the construction, operation, repair and maintenance of propellers, and the operation of equipment in the Air Base Propeller Shop.

b. The duration of this course is six weeks and includes instruction in Airplane Propellers (Basic) and Airplane Propellers (Advanced). Total number of hours: 180.

7. Instrument Specialists' Course. a. Purpose: To train especially selected enlisted men in the construction, operation, repair and maintenance of airplane instruments and the operation of equip-

ment in the Air Base Instrument Shop.

b. The duration of this course is six weeks, and includes instruction in Airplane Instruments (Basic) and Airplane Instruments (Advanced). Total number of hours: 180.

8. Electrical Specialists' Course.

a. Purpose: To train especially selected enlisted men in the construction, operation, repair and maintenance of airplane electrical units, and the operation of equipment in the Air Base Electrical Shop.

b. The duration of this course is eight weeks, and includes instruction in Airplane Electrical Systems (Basic and Advanced). Total number of hours: 240.

9. Carburetor Specialists' Course.

a. Purpose: To train especially selected enlisted men in the construction operation, repair and maintenance of engine induction, fuel and oil systems and the operation of equipment in the Air Base Carburetor Shop.

b. The duration of this course is six weeks, and includes instruction in Induction, Fuel and Oil Systems (Basic and Advanced). Total number of hours: 180.

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THE AIRPLANE DIVISION

The Airplane Division includes a number of instructional units organized for training students in Airplane Maintenance-Engineering (Officers), Airplane Mechanics (enlisted men) and two Specialists' courses (enlisted men). The primary purpose of the division, is to teach the principals of operation, inspection and maintenance of the entire airplane and its auxiliary equipment, excepting Armament, Radio and Photographic equipment. This does not include instruction in the power plant and accessories, but does include the installation of this equipment in the airplane.

The units or branches into which the division is divided, closely simulates the organization of a Repair Depot, but instead of the output being airplanes, as is the case in the Depot, here the airplanes and accessories remain stationary in the various branches and the men (students) move on from branch to branch and finally emerge from the Inspection Branch as embryonic engineers and mechanics. Each of the branches are equipped with the latest and best of tools and equipment available in the Air Corps, and continuous stress throughout all branches is placed upon the selection of the correct tools and equipment for the many airplane maintenance problems, so as to produce the best efficiency and safety. The elementary, but very important phase of how to care for these tools and equipment, is also stressed throughout the Division.

The introductory subject in the Airplane Division is a study of the general principals of the Air Corps inspection system as basically outlined in Technical Order 00-20. This is taught first because, as the student progresses through the various units or branches, he is taught the detailed inspection and maintenance requirements on the portions of the airplane, or its accessories allotted to each branch. He is then taught the whole system of Air Corps Technical Orders; the different classifications, how to use the index, what the Technical Orders consist of, and it is impressed upon him that he will have to refer to them often and diligently. Along with this he is taught the use of Stock Lists, the Parts Catalog (Section IV of each Basic Technical Order Handbook) and the

Captain Hugo P. Rush, Air Corps,
Assistant Director.

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Air Corps Drawings for the purpose of identifying parts, making installations and changes, without a knowledge of which the Engineering Officer and mechanic is lost even though well qualified otherwise. The proper use of A.C. Forms 81 and 82 (Stores Charge and Stores Credit) is taught, and henceforth, the student prepares these forms for all supplies and parts drawn or returned during the entire course.

The first shop problem is that of inspecting the fuselage and wing structure of an airplane. At present A B-10B is used for this training. In all instruction in inspection of structures, how to recognize signs of incipient failures, corrosion, deterioration of protective coatings is the primary problem. Next in sequence, is what to do about it. Following this is a study of flight control systems and their inspection and maintenance; then, tail and landing gears, wheels and brakes and a phase recently added which will be greatly expanded and emphasized in the future, hydraulic systems. The basis for the latter is the elaborate system as used in the B-18, one of which is stationed at Chanute Field, and which will be used at times for a part of the instruction in this comparatively new system. Special emphasis is placed upon the inspection and maintenance of wheels and brakes, tail and landing gears and retracting mechanism. The student becomes familiar with the above mechanisms and systems by disassembly and assembly supplemented by study assignments, classroom lectures, and discussions by the instructors. In many cases, mock-ups are provided for demonstration, and in some instances, lantern slides are projected. Malfunctions, adjustments, inspections required by Technical Orders, checking of clearances, tension of cables, and replacement of parts are the points stressed. Repairs requiring machine work are not taught as this work is covered by specialized courses for Base shop men operated in an other division of the department and which is described elsewhere in this issue.

Next, in the usual sequence, comes the training in propellers; then, instruments. These two branches not only train students in Maintenance-Engineering and Airplane Mechanics, but also Specialists. A description of both these branches is also covered separately elsewhere in this issue.

After completing propellers and instruments, the student moves into the Engine Division, and all its branches, and finally returns to the Airplane Division to complete the course. When each class returns, they bring with them three engines which they have assembled and tested. The class is assigned to three airplanes; any three of the following at present: P-26, P-26A, A-17, O-46A, B-10B, BT-2 and P-29. The three engines in the airplanes are

removed and those the class brought along with them are installed. During this engine change all instruments and connecting lines are removed, inspected and re-installed; fuel lines are removed, inspected and replaced; the engine section is thoroughly cleaned and inspected; and the entire electrical system is checked. When

spections on the latest types of modern airplanes. This work, in the Inspection Branch, is closely supervised by three enlisted and one civilian instructor who have specialized in airplane inspection for many years. This branch is equipped with the very latest and best equipment procurable for conducting airplane inspections with speed

Students performing 40 Hour Inspection on C-33

the engine change has been finished, a complete 40-hour inspection is conducted and recorded on Form 41's, provided in the authorized manner. The airplanes are serviced with gas and oil, placed on the line and the engines operated. Here the pre-flight inspection is taught. At this point, the student has completed a study of the airplane from propeller to rudder and is ready for his final finishing off.

The "finishing off" process consists of a series of 40-hour in-

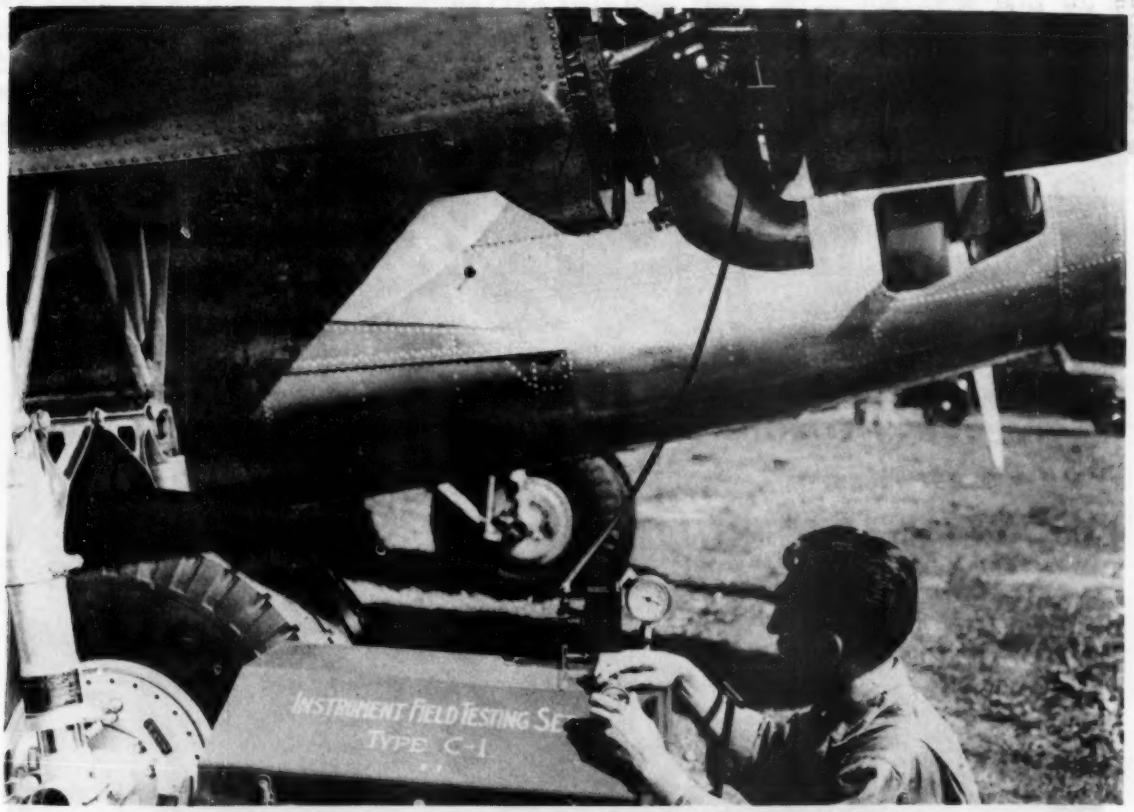
and accuracy. This includes such items as washing equipment, lubricating equipment, portable lights, cleaners, work stands, vacuum cleaners, over-head track, propeller dollies, and the many and various special tools required for propeller, engine and airplane maintenance. The first airplane inspected is a small one, such as, a P-26, PB-2 or BT-9. This is followed by a larger airplane, such as, an A-17A, or O-46A, and the final project is a B-18, C-33 or even a B-17. Since the policy was inaugurated to assign one of each series of modern airplanes to the Air

Corps Technical School, there has been no difficulty in obtaining suitable modern airplanes for this training. Previous, to this time, it was necessary occasionally to borrow airplanes from other stations. This no longer is necessary, but can still be done, if for any reason airplanes are not available. By the time this work is completed, the student has not only the necessary knowledge, but has the confidence that he can make a practical application of same with reasonable efficiency. It has been a long, hard, but very interesting grind, and each student is justly proud of the diploma he receives.

Each branch of the Airplane Division is manned by competent and experienced instructors. One civilian and one or more enlisted instructors are employed in each branch. These men have up to 20 years experience in their own specialty and most of the civilians are ex-service men of war-time experience. It is their unrestricted policy to render conscientious, efficient, and courteous service to the student and the school.

PROPELLER BRANCH

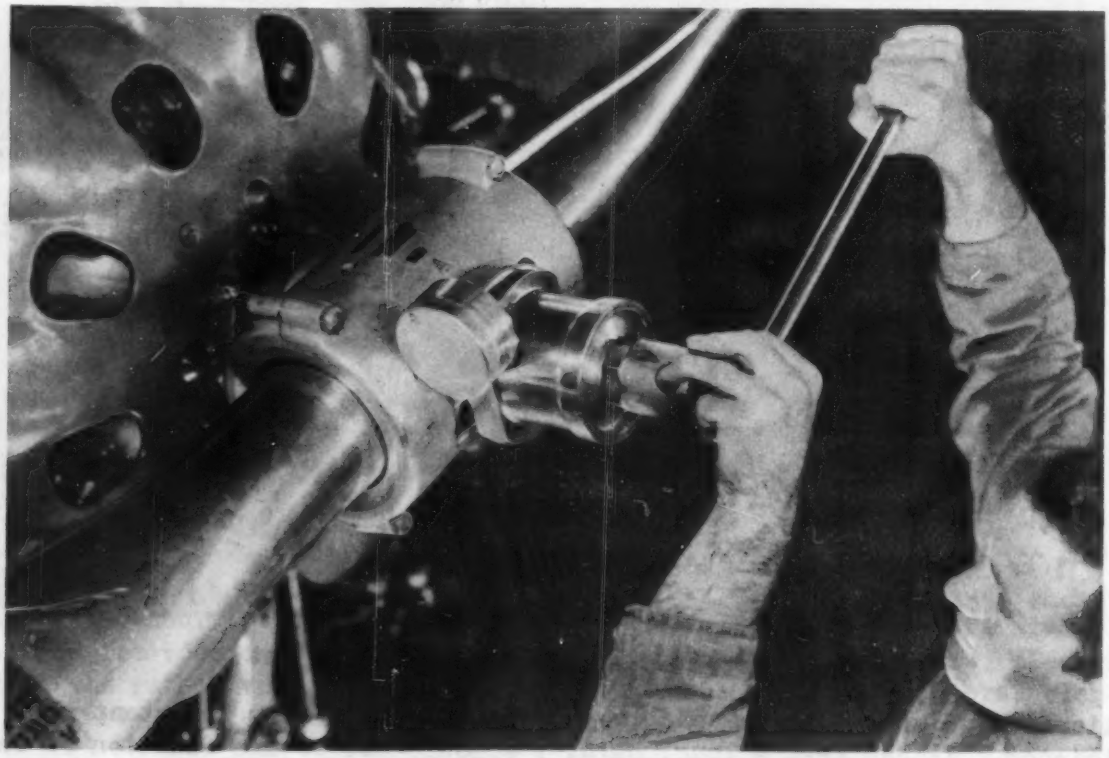
Since the advent of the controllable propeller into the Air Corps, this Branch has become a very important part of the school. It is the function of this branch to acquaint the student with the operating principles of each propeller used in the service, with sufficient shop work to train him for the duties he will be required to perform. The amount of time a student is in this branch depends on whether he is taking a course for Airplane Mechanics or Propeller Specialists; two weeks is allotted the



Checking instruments with Field Testing Set

Airplane Mechanic, while the Propeller Specialist is given six weeks. All work in the shop conforms to existing regulations as outlined in Technical Orders. Theory as applied to propellers is discussed by the instructor in the classroom. He is aided in this by the use of sectionalized models of the different types of propellers and by the actual demonstration of propeller vibration. Theory and classroom discussions have an important place in this branch, as do oral and written tests. From these tests, it is possible to determine whether the student understands that particular phase of the work.

the airplane mechanic will be trained to perform shop maintenance or overhaul of propellers. Therefore, their work in the shop is of such a nature that will train them for the duties required in the Service. The most important phase of this branch insofar as airplane mechanics are concerned, is the inspection and maintenance of propellers. The manner and procedure is first demonstrated. Each student is then required to make a similar inspection on each type of propeller. By the time the student reaches this point he has been instructed in the proper nomenclature and function of component parts of the propeller, as well as the assembly and associated operations.



Student checking Propeller

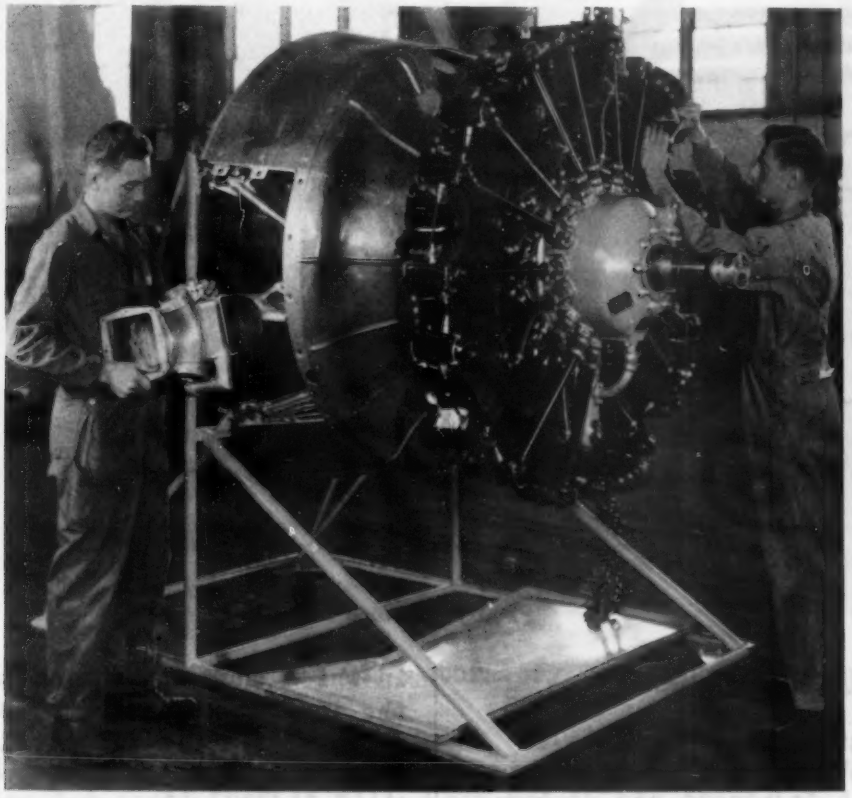
In the shop the students work in groups of three, having modern shop equipment and hand tools at their disposal. The work given here depends again on the course of instruction. For example, it is not intended that

He has then a knowledge of the equipment he is inspecting and the procedure of making an inspection. Checking track and blade angle with a propeller installed is part of the instruction given. Each student checks the blade angle with

the Universal Protractor. The different types of propellers are removed and reinstalled under the supervision of the instructor. The importance of this phase is emphasized. On completing the two weeks in this branch, a final examination and proficiency grade is given. If both are satisfactory the student is permitted to proceed in his course.

The Propeller Specialists undergo the same instruction as the airplane mechanic the first two weeks of his course. Work in the shop is such that will enable the student to perform an overhaul and repair the different types of propellers. It includes disassembly and inspection of all component parts, either visual or by the magnaflux method. The propeller is then assembled, checked for track, blade angle is set and it is balanced. The finished propeller is checked by the instructor who holds the student to a high degree of accuracy. They are instructed in the use of the special tools required for the different types of propellers.

Commissioned officers undergoing a course of instruction in Airplane Maintenance-Engineering are given a two weeks period in this branch. These students are trained to supervise any and all work on propellers and to be able to make a decision on the serviceability of a propeller or its parts. The importance of the periodic inspections is stressed as well as the common service troubles and the means of correcting the same is discussed and demonstrated. This information is invaluable to the Engineering Officer.



Students assembling engine and accessories for C-33

Briefly the information and instruction given the student in this branch, not only enlightens them on the subject matter, but it also gives him confidence in his own work with the satisfaction of knowing the work performed is the approved method and the results gratifying. This comes from training.

ments, inspection and installation practice.

Demonstration lectures are given using sectionalized models to first familiarize the student with the purposes, uses, and operating principals of each instrument. This is immediately followed by laboratory experiments

Prony Brake Test

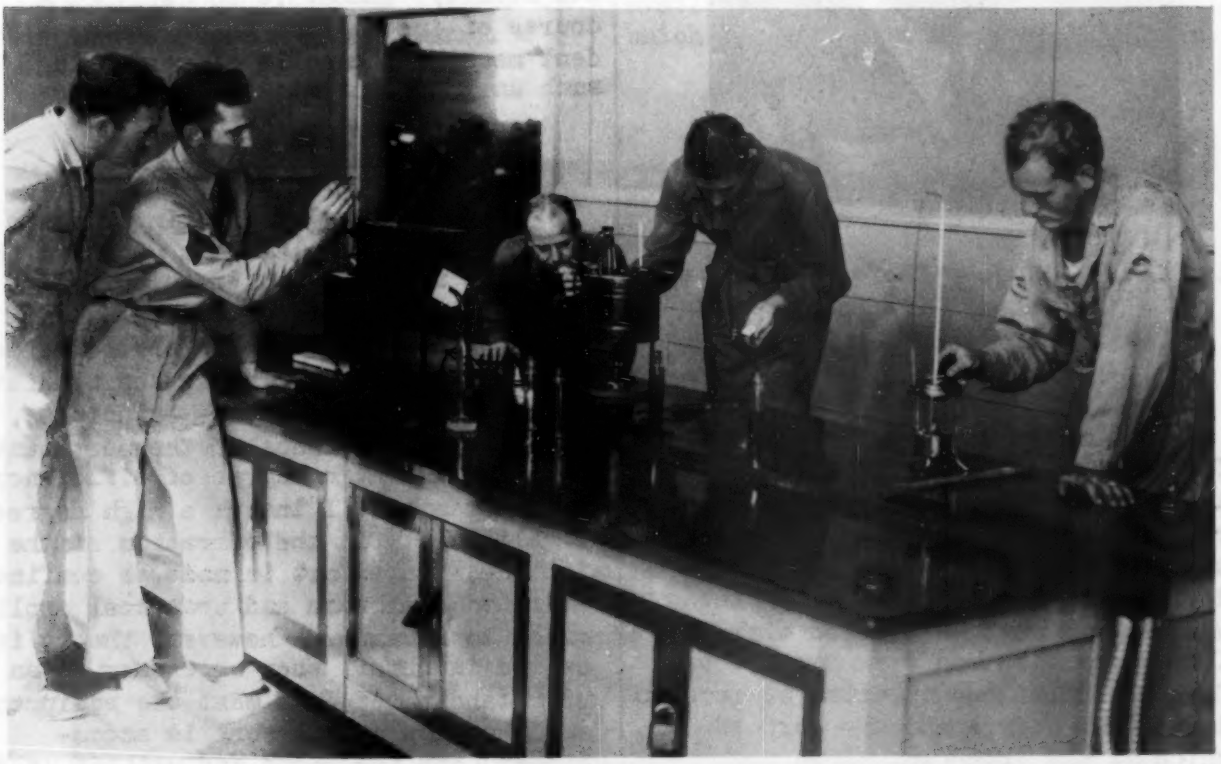
INSTRUMENT BRANCH

Instruction on instruments is considered to be a very necessary part of the training given to the combat crews and maintenance personnel of all airplanes. In this school an instrument laboratory containing all of the standard instruments and their necessary maintenance equipment is available for this training.

Instruction consists of demonstration lectures, laboratory experiin which each student actually operates the instrument under the same conditions as it is subjected to in flight. Each instrument is run up and down through its scale range and the readings at each calibration point are compared with a manometer, a barometer or other equivalent of a master gage. By this means, he learns to correctly read the instruments, learn their limitations, and determine their accuracy. Particular stress is laid on the very close tolerance required in aircraft instru-

ment, he is taught repair practices and procedure, such as present regulations permit in field organizations. This includes cleaning and lubrication of external parts, replacement of broken cover glasses, the sealing of cases, the resetting of dials and pointers, the use of zero adjusters and minor adjustments of internal parts. Following the minor repair of an instrument, it is then given a scale error test and such other special tests as are required to determine without a doubt that it will function correctly on an airplane, under flight conditions.

Following the laboratory instruction each class is assigned to school airplanes and are taught the inspection procedure and maintenance required at periodic intervals on service airplanes. The portable field test set is used for this instruction. Emphasis is placed on the necessity of correct and proper installation of instruments. Installations and discussion of such defects as sharp bends, fouled lines, leaks restrictions and improper fittings are given so that the student is lead to the realization that perfection is the only standard that is acceptable for any instrument that is installed on an airplane.



Fuel and Oil Laboratory Testing

Approximately thirty basic instruments with their respective variations are covered in the course of instruction. This includes all the standard engine and flight instruments and very recent developments such as the automatic pilot, exhaust gas analizers, autosyn and other new types of electrically operated instruments. Graduates are competent to perform the necessary instrument maintenance and repair required in squadron, group and Base Engineering units of service organizations in the Field.

THE POWER PLANT DIVISION

1st Lieut. R. J. O'Keefe, Air Corps,
Assistant Director.

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The human body is the most perfect mechanism devised by nature. Analogously, the power plant and the related equipment of the modern airplane is the most perfect mechanism devised by man. Figuratively, the power plant must be treated with similar discretion and care prescribed for the human body in order to perform, during its life span, the purpose for which it was intended. Both of these mechanisms are capable of withstanding abuse and mistreatment; however, there is always a day of reckoning. Whereas one mechanism maintains and repairs itself with very little assistance, the other is dependent for its very existence upon the ability and care of that man affectionately called "The Greaseball". The power plant is the heart of the airplane; the operator is the brain; the fuel and oil is the food and drink; the time between overhauls is the useful life; the mechanic is the physician and surgeon. The mechanic - the "Doctor", is a major cog in the intricate organization of the Air Corps. He doesn't fly an airplane, but it can not fly without him. He treats and maintains a power plant at such a high standard that every available horsepower may be "nursed" out of the equipment with a high degree of reliability. This division, within the limits of its ability, endeavors to carry on a course of instruction which trains student mechanics capable of performing such an important mission.

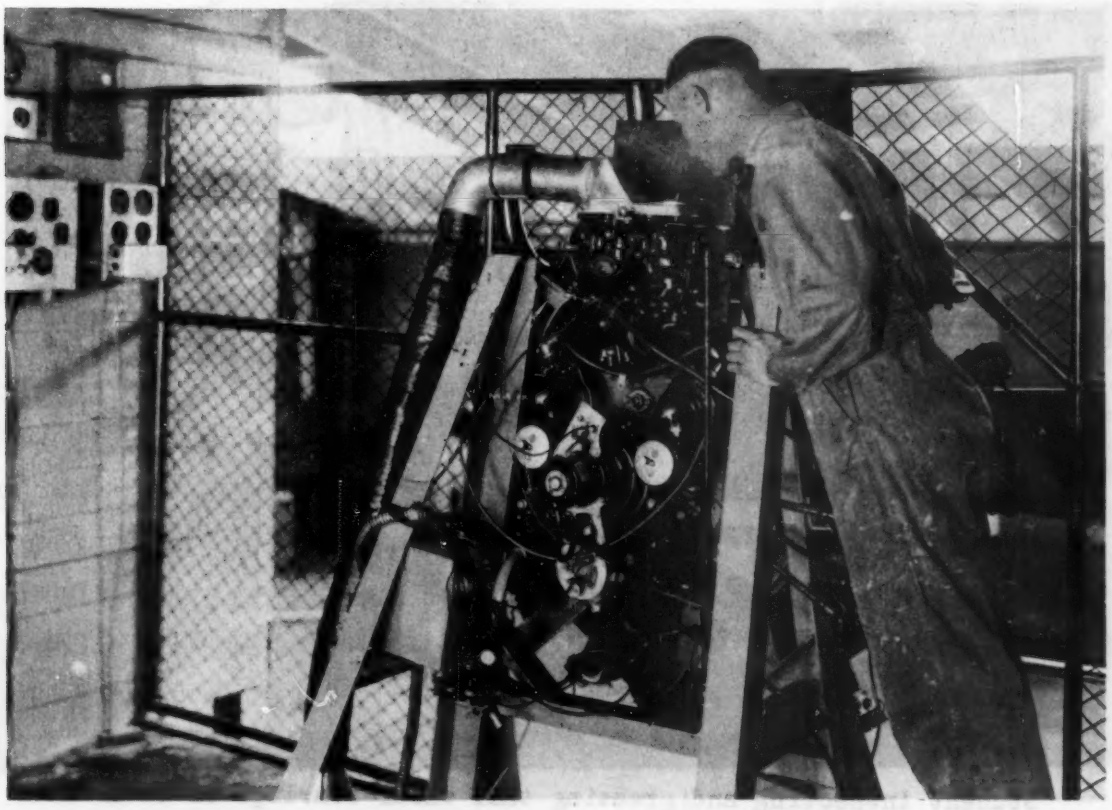
METHOD OF INSTRUCTION

The objective of this instruction is to impart to the student mechanic the knowledge necessary to efficient maintenance and repair of the power plant and related systems. This objective is accomplished by instructing the student in construction, operating principles, and proper maintenance of the pertinent equipment. A high degree of efficiency in a mechanic will insure a high degree of reliability in the operation of the airplane. An effort is made to confine theory to a minimum and practical application to a maximum; however, theory is covered in detail when necessary to an understanding of just what the equipment does, how its useful work is accomplished, and the means and methods used to maintain a high standard of performance. School texts and technical publications are given to the student for study outside of classroom and shop, and for a guide in the classroom and shop. Numerous lectures supplement the study and practical application for a better understanding of the subject.

SECTIONALIZED UNITS AND DEMONSTRATIONS

The intricacies of operating machinery are usually mysteries to the student until the equipment has been totally dismantled. Where complete dis-

assembly does not permit complete understanding, "cut-away" or sectionalized units are utilized to expose hidden complexities. The mystery is a mystery no longer and is exposed in all its nakedness to be just a simple operation or effect. For example, sectionalized carburetors, superchargers, pumps, cylinders, magnetos, valves, etc., are used. The student is given a detailed explanation of carburetor icing. To supplement the explanation he observes through a glass window the actual formation of ice in a carburetor installed on an operating engine. The carburetor icing conditions are introduced at will on the engine test stand where the student sees the ice form and then disappear as the carburetor heat control is operated. He not only knows how the ice forms, but he sees the formation and observes the effect on engine performance. Detonation is demonstrated on a one cylinder gasoline engine to supplement the classroom explanation of the phenomenon. Aircraft engine instruments are used to give the student the identical indications he would encounter in a detonating aircraft engine. He is instructed in the cause, observes the effect, and learns how to use the available means of preventing detonation which has become a serious problem in present-day highly supercharged aircraft engines. From the above, it is obvious that sectionalized units and demonstrations tend to simplify an otherwise complex subject.



Carburetor Icing Demonstration

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KEEPING UP-TO-DATE

Close contact with the Materiel Division, Air Depots and the manufacturer enables the instructors to pass on to the student the development of experimental equipment, maintenance and repair information, and factory methods of construction. The value to the student of this close contact is undoubtedly beneficial because the information procured is as up-to-date as is humanly possible. Such information permits the instructor to advance his knowledge with the development of the power plant which has progressed very rapidly in the last few years, and from all appearances will progress with even greater rapidity in the future.

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THE PHASES OF INSTRUCTION

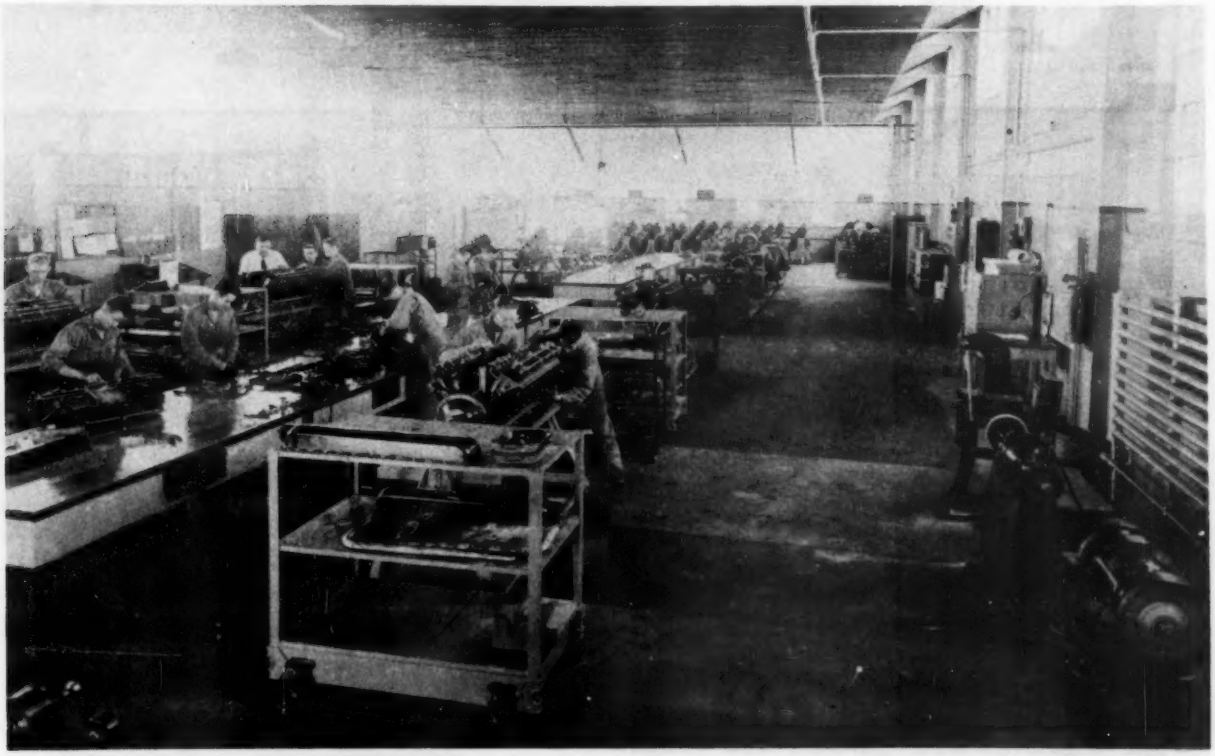
The instruction in the Engine Division is divided into four phases, i.e., Engine Construction and Repair; Electrical Systems; Fuel, Oil and Induction Systems; Engine Operation and Test. The airplane mechanic covers the four phases in approximately eleven weeks. In addition to the airplane mechanics course, two specialist courses are given in Fuel, Oil and Induction Systems and Electrical Systems of six and eight weeks respectively. Engineering Officers take the eleven week mechanics' course and cover practically the same ground as that prescribed for the enlisted mechanic. A short course of four weeks is given to National Guard and Reserve Engineering Officers during the summer months. From the above it can be seen that the Engineering Officer

Student inspecting and greasing tail wheel bearings on O-46

receives the training necessary for his understanding of the problems and difficulties confronting the mechanic in the maintenance and repair of the aircraft power plant.

ENGINE CONSTRUCTION & REPAIR

This phase of the instruction is divided into two separate sections, namely, liquid-cooled and air-cooled engine construction and repair. Modern liquid-cooled engines are used in the work shop and are completely torn down and checked. The necessary maintenance and repair of the engine is studied by the student with particular emphasis given to inspection and adjustment. During the process of disassembly the construction of the engine is studied and discussed. Coolants and cooling systems are covered thoroughly at this time. Modern single row and double row radial air-cooled engines follow the same procedure described above, except in the amount of time spent on the subject due to the present preponderance of air-cooled radial engines used in the "Service". At the close of this phase of the course the engines are adjusted and inspected and prepared for installation on the test blocks where they will be used in the last phase of instruction covering operation and engine test.



Engine Construction & Repair

FUEL, OIL & INDUCTION SYSTEMS

This phase of the instruction is divided into five sections; namely, fuel and lubricant laboratory testing; carburetors and carburetion; fuel injectors and fuel injection, fuel and oil systems;

oil reclamation. Laboratory work consists of the standard tests required by the Air Corps of all fuels and lubricants used on an airplane. The chemistry of fuels and lubricants is covered for a better understanding of their utility. The operation of carburetors, fuel injectors, superchargers, and fuel and oil system units are covered thoroughly. The operation and maintenance of an oil reclamation plant is included in this phase. The operating and maintenance of these complete systems as installed in the airplane complete the course during this phase of the instruction. Frequent demonstrations during instruction supplement the classroom and shop work of the student.

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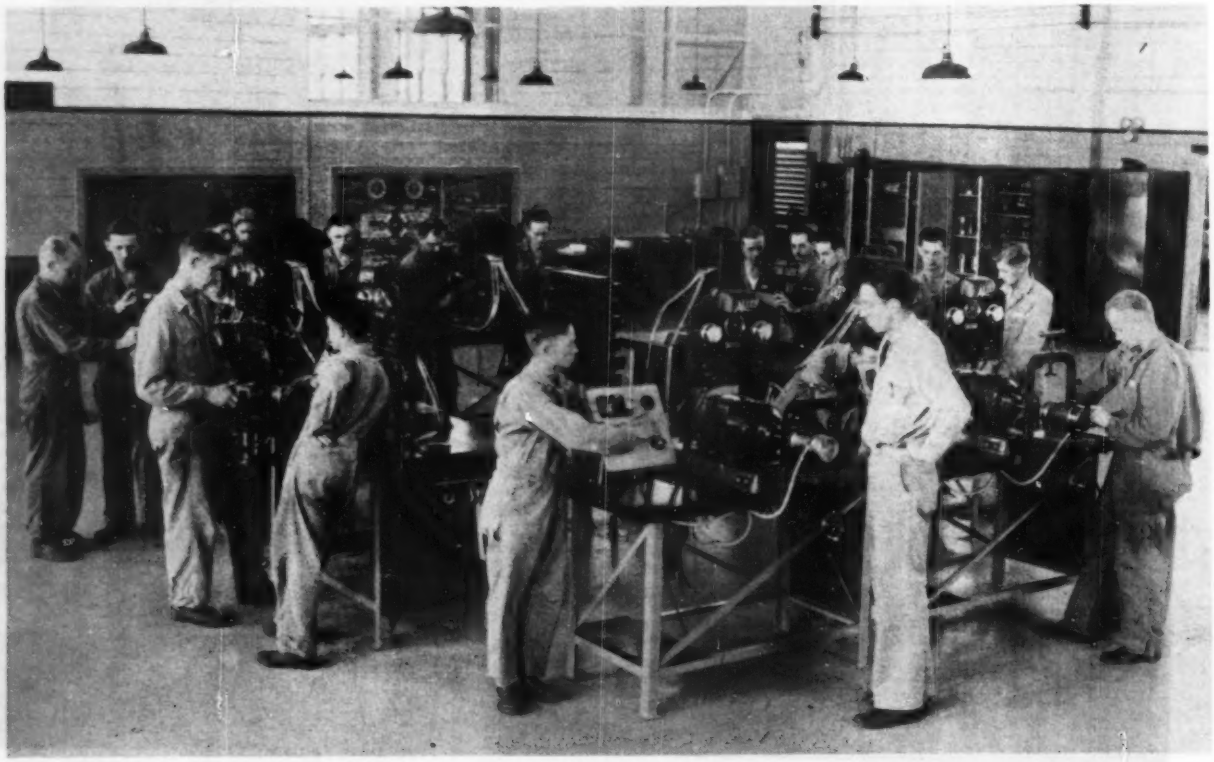
ELECTRICAL SYSTEMS

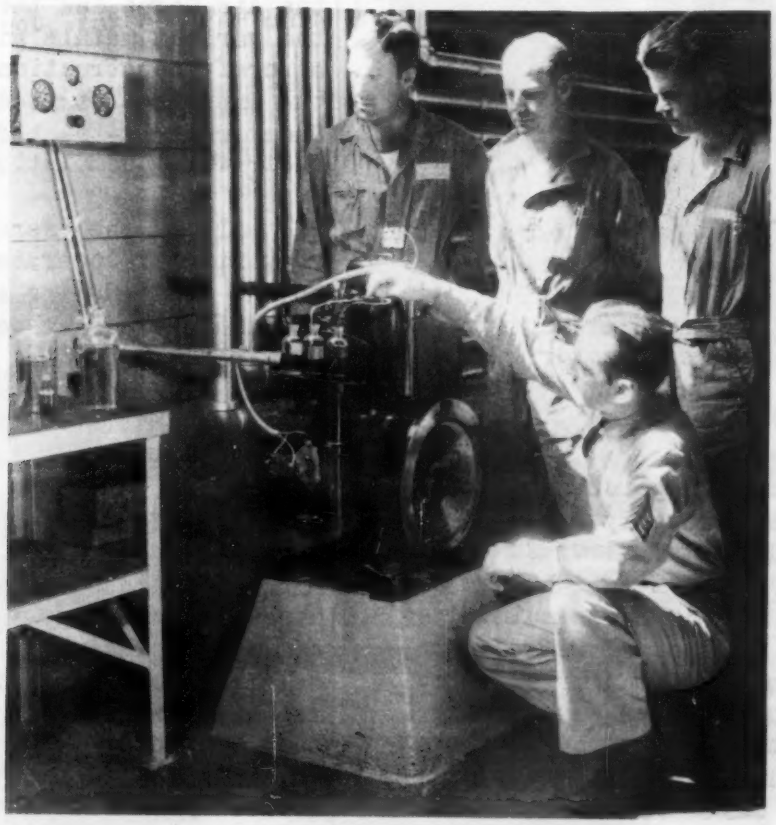
This phase of the instruction is divided into two sections; namely, power plant electrical systems and airplane electrical systems. The instruction in power plant electrical systems consists of test, maintenance and repair of the battery; generator and control system; starter and starter system; ignition system and bonding; shielding and metallizing. The instruction in airplane electrical systems consists of test and maintenance of the electrically operated airplane equipment such as cowling flaps, landing gear, lighting system, propeller, etc. The student is taught how to check the electrical equipment while it is installed in the airplane when such a check is practicable in "trouble shooting". Complete airplane and power



Electrical Test Stands

plant electrical wiring and installation drawings are utilized for study and shop work to familiarize the student with the interrelated individual electrical units and how to "check out" any part of the electrical system by the use of the "voltage-drop" method of test.

test. The instructor introduces "trouble" into the power plant and then teaches the student how to determine logically its elimination. A systematized method of "trouble finding" is taught to facilitate the location of any malfunction in a minimum length of time. The procedure of treating an



Detonation Demonstration

ENGINE OPERATION AND TEST

This phase of the instruction is divided into four sections, namely, engine operation, engine test, power plant "trouble finding", and engine storage and shipment. The instruction in operation includes engine starting, engine "warm-up", engine check, the operation of the power plant during flight, and engine "shut-down". The student is instructed in test block procedure and the conclusions to be drawn from this

engine for storage and shipment is covered in detail. This terminates the course of instruction given the airplane mechanic during his short stay in this division and it is thoroughly believed that he is competent to take his place in the service as an embryo mechanic who needs only the actual experience necessary to his full development.

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MACHINE SHOP DIVISION

1st Lieut. William P. Sloan, Air Corps, Assistant Director.

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The primary mission of this division is to thoroughly train enlisted aircraft machinists, aircraft welders, and aircraft sheet metal workers for duty in Base Repair Shops maintained at Air Corps stations. In addition, each class of Regular Army officers taking the Maintenance-Engineering course is given two months or approximately 240 hours of practical shop instruction.

In their two months in this division, the officers' class is given instruction in Lathe Operation, Milling Machines and Shapers, Heat-treating, Precision Grinding, Airplane Sheet Metal Work and Aircraft Welding.

During the two weeks of lathe operation, the officer starts a series of exercises designed to give him experience with each type of work normally performed on a lathe. Additional operations such as fluting reamers, gear cutting, cutting heads on special bolts, and forming Vee blocks are performed on either the milling machine or shaper during the week allotted to that subject. The exercises are then ready for heat-treatment before being finished by grinding.

During the half week allotted heat-treating, instruction is given in all methods of heat-treatment used by the Air Corps and their application to the various metals and alloys used in aircraft construction. At this time, the exercises started in the Machine Shop are heat-treated preparatory to their final completion.

All of the exercises that require a very fine or accurate finish are ground to the desired size and finished during the student's last week in the Machine Shop.

The next step in the Engineering Officer's training is aircraft sheet metal work. In this section, he learns the kind of metals and alloys used in aircraft fabrication, and their uses and limitations are emphasized, both in classroom and shop work. The shop work consists principally of the fabrication of small aircraft parts from sheet metal and the repair of school airplanes. Many of the articles manufactured in this section require welding or silver soldering for completion and are taken to the Welding Shop by the student.

In the welding section the student makes practice welds on all weldable metals and alloys used by the Air Corps until he becomes sufficiently proficient to complete the exercises started in the sheet metal section. Inspection of welds for quality and the proper use and limitations of welding in aircraft repair is particularly emphasized. At this time the student officer has completed two months of training in the Machinists Division of the Department of Mechanics and is transferred to the Airplane Division.

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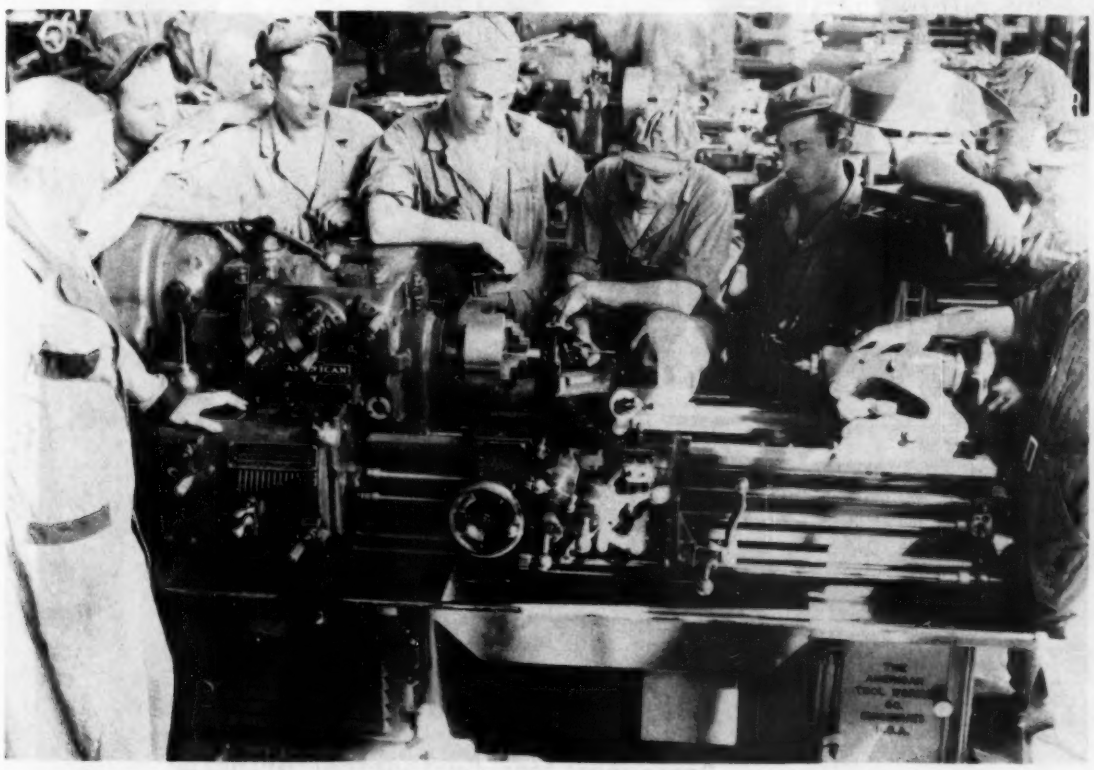
The enlisted student entering this Division selects either the Aircraft Machinists' course or the Aircraft Welders-Sheet Metal Workers' Course. Both of these courses are highly specialized and are arranged to fit the student for one particular job in the Base Repair Shop. Both courses for enlisted men, cover in general, the same instruction given the Engineering officer student, but are far more detailed and exacting. The objectives of these courses are to train the students to a degree of proficiency that will enable them to produce an excellent grade of work on returning to their home station.

The Machinists' course requires twenty weeks or approximately 600 hours to complete. This time is allotted to the four general subjects in Lathe Operation; Milling Machines and Shapers; Forging & Heat-Treating, and Precision Grinding.

In the lathe operation course the student is first started out with demonstrations of correct methods of operation and procedures. Following each demonstration he is given practice exercises designed to make him proficient in all lathe operations used in aircraft repair and maintenance of Air Field equipment.



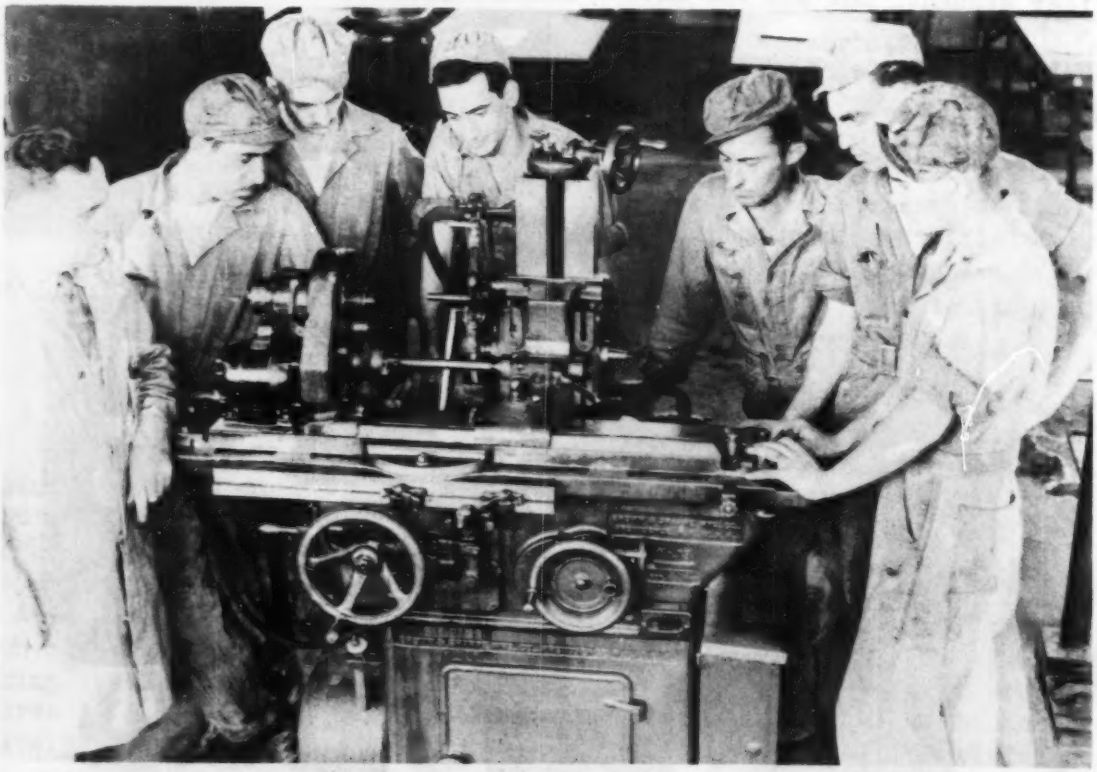
Demonstration: Lathe Work

As soon as his progress permits, the student is given work orders received from other divisions and is thus given every possible opportunity to manufacture parts and equipment for flying airplanes.

Normal progress finds the student starting work on milling machines and shapers at the beginning of his ninth week in school. Instructions in this phase includes plain, face, end and angular milling, gear cutting, dove tailing,

screw slotting, etc. Six weeks of work in this section and the student will have completed a number of projects that will require heat-treatment before they can be finished and will have attained a rather high degree of proficiency in general lathe, milling machine, and shaper operation.

In the last two weeks the student machinist learns precision grinding, grind finishing, sharpening of special tools, milling cutters, reamers, etc. Extreme accuracy is stressed in this work, together with the proper grade and type of grinding wheel to use for best results, on different kinds of materials. This two weeks completes the instruction and he graduates with a rather thorough knowledge of machine work required in aircraft maintenance and repair; however, due to the short time allotted for the entire course the graduate lacks that knowledge that must be gained only through experience, and experience only. It is therefore desirable that the graduate make every effort to continue in the line of work for which he has been trained for that is the only method whereby he may gain the experience vitally necessary to become a finished machinist.



Demonstration: Cylindrical Grinding

Four weeks are devoted to forging and heat-treating. The first two weeks are occupied by forging and the last two by heat-treating. Forge work includes fabrication of tools, the manufacture of hooks, chains, hold-down screws, and welding and repair of equipment. Instruction in heat-treatment of material is for the machinist directed primarily toward the treatment of the metals and alloys that he will use in the machine shop, and in addition, he is given a working knowledge of the heat-treatment of other metals used by the Air Corps.

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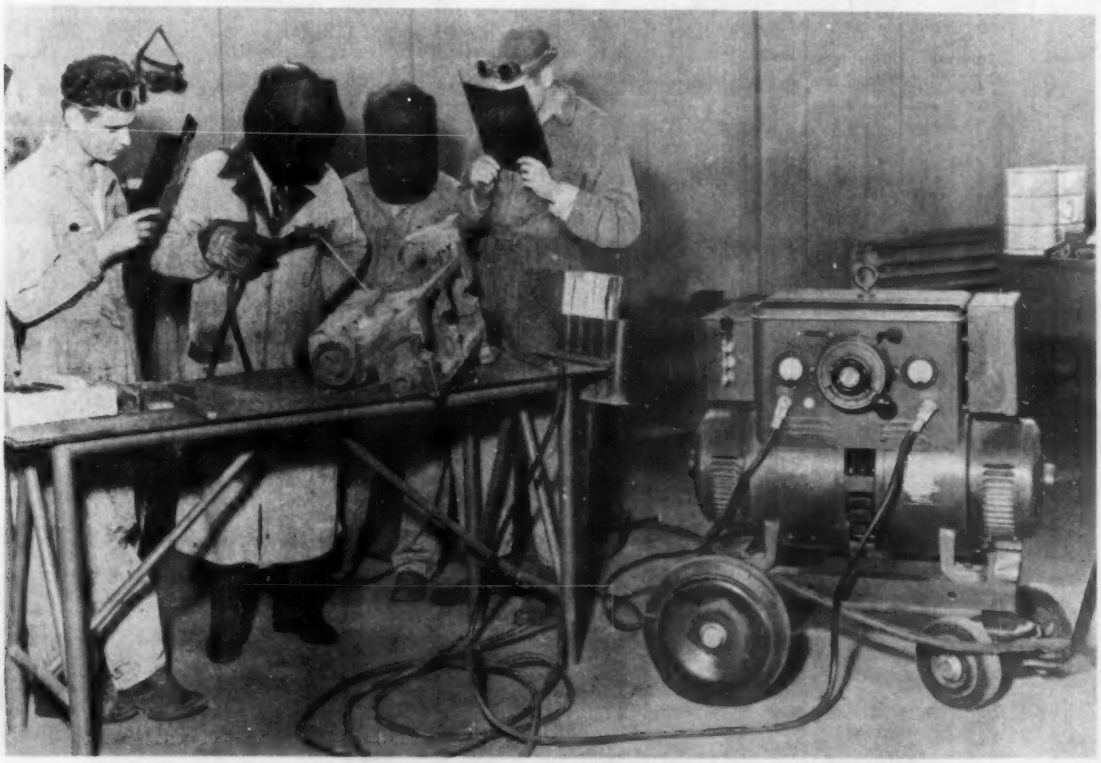
The Aircraft Welders-Sheet Metal Workers' Course for enlisted men requires twenty-four weeks or 720 hours for completion. It is divided into five phases, i.e., Basic Sheet Metal Work; Aircraft Sheet Metal Work; Heat-treatment of Metals; Basic Welding, and Aircraft Welding.

Basic sheet metal work is, as its name implies, designed to teach the student the use of metal forming tools and to make him proficient in their use. Fabrication of funnels, measuring cans, the forming of seams and splices, soft soldering and cable splicing are among the exercises used in this phase of the course.

The seven weeks devoted to aircraft sheet metal work are spent entirely on that subject. The early part of this phase is spent in the repair and fabrication of cowlings, exhaust manifolds, special brackets, and the repair of cracks and tears in metal covered surfaces and fuselages. The repair and fabrication of small stressed parts of the airplane is taught during the latter part of the aircraft sheet metal phase of instruction. The majority of this work is done on wrecked airplanes transferred to this school for training purposes. Strict adherence to technical instructions and the careful selection of the correct material for repairs is emphasized throughout this course.



Demonstration: Arc Welding

Heat-treating of the materials used is of prime importance, and while only a week is spent on this subject, its importance is carefully impressed upon the student. Heat-treatment of those particular materials that the sheet metal worker will use is the primary objective of this phase; however, a working knowledge of

heat-treatment of other Air Corps specification metals is included.

The Welding Course is divided into Basic or "Primary Instruction" and actual aircraft welding.

In the basic course the student learns the care and operation of standard welding equipment, the use of welding fluxes, the various types of

thereby determining the actual strength of the joint. A large amount of practice is given on every type of metal or alloy used by the Air Corps. The student is required to become thoroughly proficient in this "practice or basic" welding before he may pass on to aircraft work.

In aircraft welding the student learns to apply the welding principles

Class in Basic Welding

welded joints, and their adaptability to general repair work. In order to learn the quality of his work and proper methods of welding the student makes cross sections of his sample welds and then by polishing and etching he is able to determine whether or not a complete union has been made between the two metals. Further tests are made by actually breaking the test welds under tension and

and methods learned in basic welding to aircraft repair. The work performed in this phase is confined entirely to exercises representing actual aircraft work, repair on school airplanes so arranged that every practical use of welding in repair work is learned, and where the work is available and the student's proficiency at the time permits, the repair of flying airplanes. Special emphasis is placed on the limitations of welding

in repair, and in this connection, the student must definitely know what materials cannot be successfully welded and the reasons therefor.

Again as in the Machinists' course too much emphasis cannot be placed on the desirability of our graduates being assigned to the work for which they were trained as soon as possible after graduation. Experience, following a thorough training in the fundamentals of the work, is without any doubt the best of all teachers, and time limitations here do not permit us to give the graduates the desired amount of experience. The graduate should make every effort to follow up his training with actual experience for in so doing, and by diligent application of his school training, he has every opportunity of becoming an expert in the work he has chosen.

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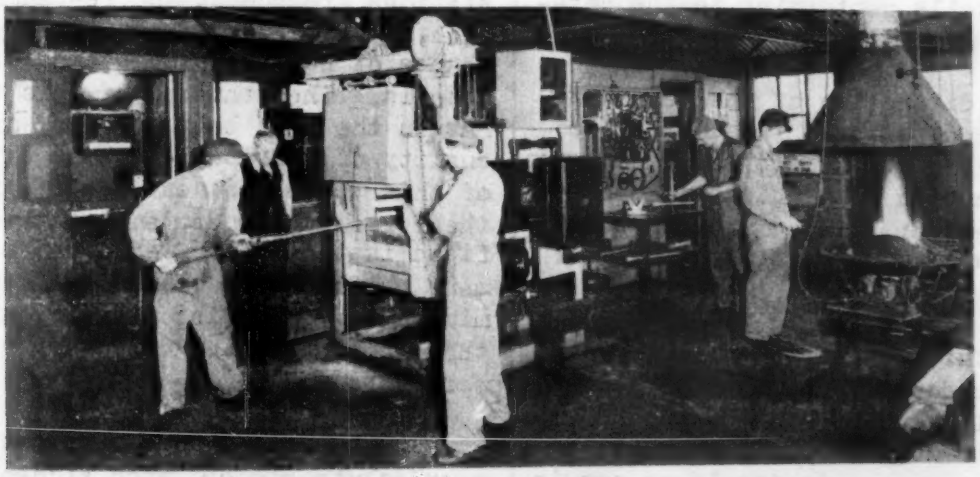
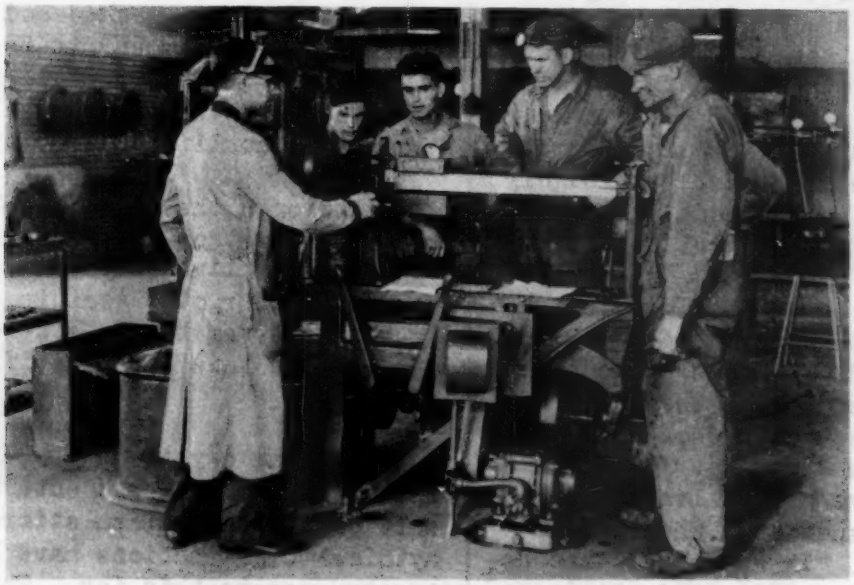


Class in Heat Treating



Testing the strength of a Welded Tube

THE PARACHUTE DIVISION

The Parachute Division is charged with the responsibility of conducting the course for Parachute Riggers and in this division the student officers pursuing the Airplane Maintenance-Engineering course spend two weeks in the latter stages of their training, where they become highly proficient in the various technical details pertaining to the parachute in general.

Any discussion of the Parachute Riggers' course, and the importance attached thereto, would be incomplete if the caution with which prospective candidates for this course are scrutinized was not made clear at the outset.

As this course is only two months in duration and the technical details involved in the study of parachutes is comparatively simple, it naturally recommends itself as one in which a soldier can get a diploma in a hurry. Since the parachute game is one in which a 100% performance is required and mistakes are absolutely not allowed, it is of paramount importance that men assigned to take this important training must, first, be of the type who can be thoroughly depended upon and, second, possess a high degree of mechanical skill.

In order to be eligible for enrollment in the Parachute Riggers' course, Army Regulations provide that applicants must have been graduated from one of the other technical courses at the Air Corps Technical School, or have had at least one year's experience as a mechanic in the Air Corps. In any event, the detail of applicants as students in this course is subject to the approval of the authorities of the school and of their respective organization commanders.

Once a student has been assigned for training to the Parachute Division, he immediately finds that the course is divided into two principle subjects; first, Parachute Construction and Repair and, second, Parachute Inspection and Maintenance. During the course of this training, all duties which devolve upon the parachute man when on duty at Air Corps stations are taught and re-taught in such a manner that there is very little chance of his ever forgetting any of the details. The standard of this training has in the past been so high, and the quality of service performed by graduates of this school so nearly perfect, that the Parachute Department at the average field is taken for granted as a department which always clicks and requires a minimum of supervision by anyone other than those assigned directly to the department.

In the last stage of his training as a parachute rigger, each student is encouraged to make at least one live parachute jump. As this jump is made with a parachute folded, packed and inspected by the student jumper, it is needless to say that it is looked upon as the final examination which entitles him to a diploma as a qualified parachute rigger.

Although the Parachute School has been in operation for many years, and thousands of live jumps have been made by students undergoing training therein, there has never been a single fatality as a result of this rather stiff "Final exam."

Jumping day is naturally a red letter day for the students and as a result of the enthusiasm stirred up, many mythical organizations have been created to commemorate this day. The Rip Cord Club of the World seems to be the coveted "lodge" and at the present writing has a membership well up in the thousands.

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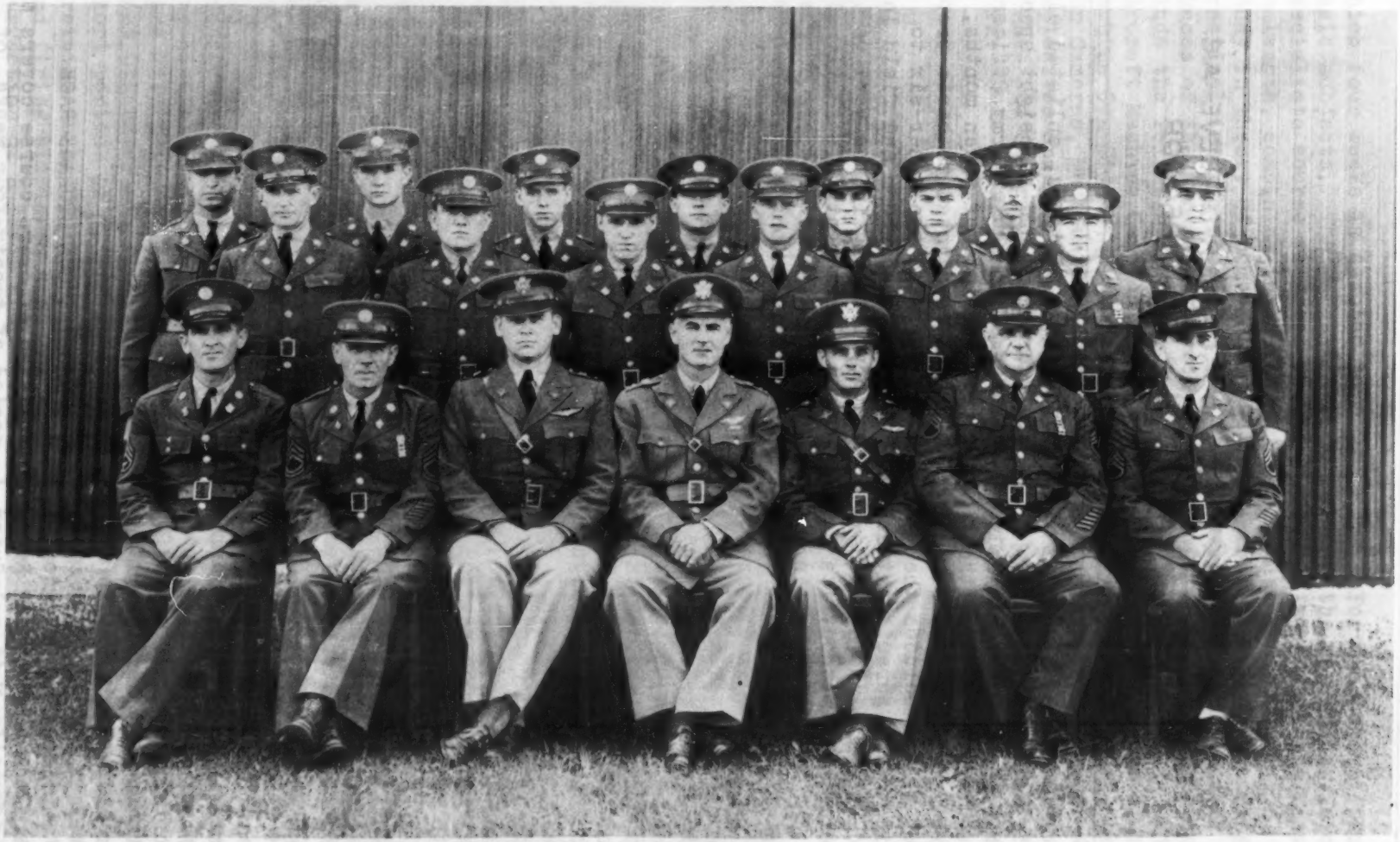
"Maggie" and "Jiggs" - a couple of stooges for the Parachute Department, who have made hundreds of test jumps, all of which have been successful.

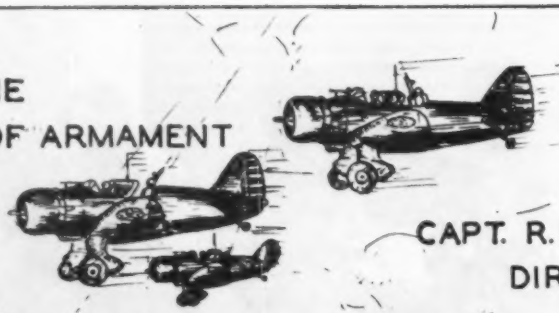
J. TORUNES
Basic
P. J. KINEALY
Comm.
J. B. STEWART
Mech.
R. CARRINGTON
Mech.
M. ROTLAND
Basic
S. K. [illegible]
Comm.
TROY TOLLE
Mech.
L. OGLE
Mech.
J. P. WYETT
Photo.
H. J. ROBERTS
Mech.
C. M. [illegible]
Mech.
B. ANDERSON
Mech.
F. E. FINK
Clerical
H. KIDDER
Photo.
C. J. MOORE
Mech.
C. W. RICHARD
Comm.
A. P. LAZZIS
Basic
CIVILIAN INSTRUCTORS
W. H. JACKSON
Mech.
W. H. [illegible]
Mech.
F. MARTIN
Mech.
C. O. HIRSCH
Mech.
A. V. PURSAAND
Photo.
H. R. JOHANSON
Mech.
D. ALLEN
Mech.
T. H. STINSON
Mech.
R. K. BRANSON
Mech.
J. L. SPRAGUE
Mech.
D. DRINKWALTER
Basic
J. R. CARROLL
Mech.



- THE DEPARTMENT OF ARMAMENT -

Reading left to right - Back Row: Corp. R.M. Sinnen, Pvt's C.A. Proctor, G.L. Huntsman, V.R. DeCanter, G.L. Phillips, R.L. VonDuyke, Middle Row: Sgt. F.P. Mason, Pvt. D. Moyer, Corp. L.S. Ringo, Pvt. J. Watterson, Pfc. P. Blalock, Corp. R.U. Green, Sgt. W.S. Blalock. Bottom Row: St. Sgt. W.O. Brewer, T.Sgt. A. Junkert, Lt. N.H. Ives, Capt. R.D. Reeve, Lt. W.D. Ganey, S.Sgt's Kingman, Shine.

THE DEPARTMENT OF ARMAMENT



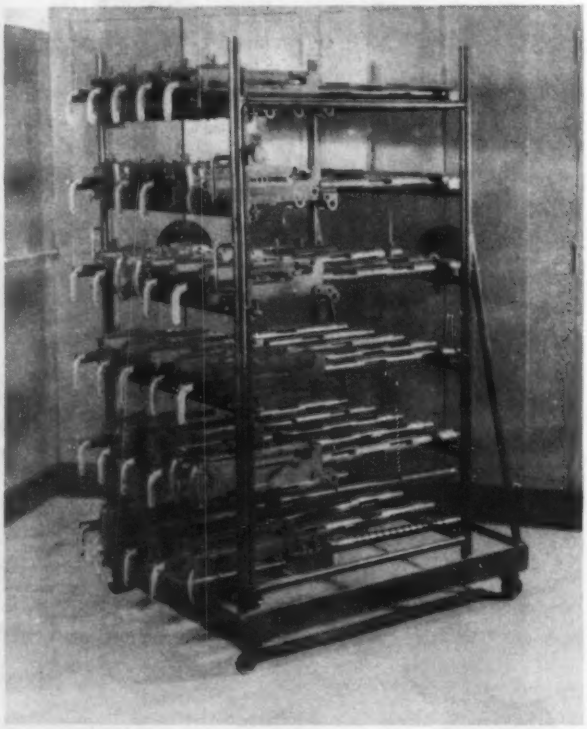
CAPT. R. D. REEVE A.C.
DIRECTOR

Anyone will readily admit that an airplane will not fly without an engine, and conversely, that an engine cannot fly without an airplane. But this department has a creed which includes the basic logic that a pursuit, attack or bombardment airplane has no excuse for existence without its armament, and further, that in wartime operations no combat organization, despite the excellence of its flying equipment and the skill of its pilots, can be better than its armament and its employment.

Accordingly, the Department of Armament of The Air Corps Technical School has for its assigned and self-assumed purpose the training of thoroughly competent Air Corps Armament Officers and enlisted aircraft armorers, together with necessary specialist and allied phases requisite to the highest order of maintenance of combat aircraft armament for the various organizations of the U. S. Army Air Corps.

To the above end constant effort is put forth to instruct all students in not only the armament equipment and installations used on current types of aircraft, but also the newest developments and as far as possible future developments.

The curricula of this department include courses for Regular Army Officers, National Guard and Reserve Officers, enlisted aircraft armorers and bombsight specialists. The Regular Army Officers course consists of seven months, one of which is devoted to basic preparatory work and the other six to intensive class-room and field laboratory training in the various phases of armament. The National Guard and Reserve Officers course is of three months' duration. The



MACHINE GUN STORAGE RACK

enlisted armorers course covers a period of twenty-four weeks, of

which four weeks is devoted to basic subjects. The bombsight specialists course is eight weeks in length, combining intensive study in theory of bombsights and practical instrument work. The phases of the Armament courses include the following: Small Arms, Aircraft Machine Guns, Aircraft Machine Gun Sights, Synchronizing, Gun Cameras, Machine Gun Mounts, Explosives and Ammunition, Bombsights and Camera Obscura, Wire Work, Sheet Metal Work, Bomb Racks, Flare Racks, Tow Target Equipment, Machine Gun Electric Controls, Bombing Electric Controls, Chemical Warfare Materials and Equipment, Armament Organization, and at present, short periods of intensive field training in servicing of bombing and firing airplanes together with correction of natural and artificial malfunctions.

For the accomplishment of the above the department is composed of four divisions: the Elementary and Specialization Division, the Machine Gun Division, the Bombing Division and the Chemical Warfare Division, each of which is supervised by an individual officer. Instruction is presented by a corps of four officer instructors and twenty enlisted instructors, each of whom is a specialist in one or more particular phases, but each of whom is, as a result of intensive training during the last two years, capable of instructing in any of the phases of armament. The program of instruction for the present year will include graduation of one Officers Class of approximately ten members, eleven enlisted armorers classes of fifteen members each and five bombsight specialist classes of eight members each. During the last two years the enlisted classes have

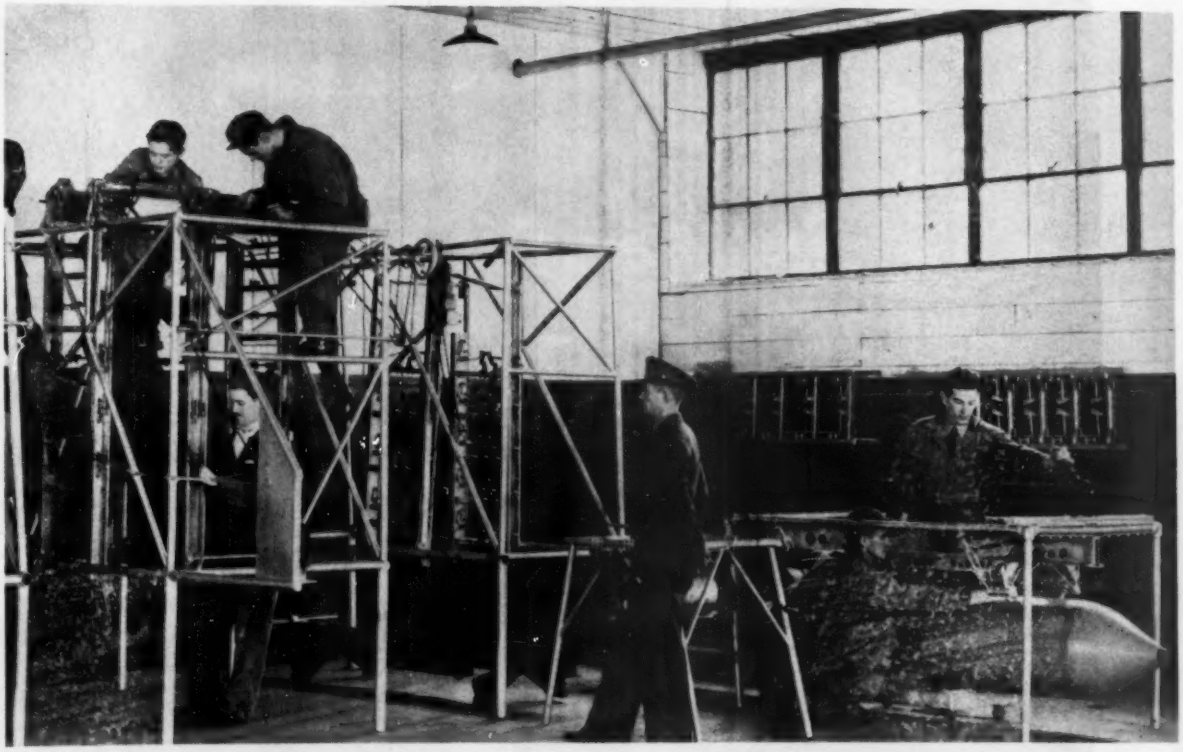
STUDENTS FUZING AND LOADING BOMBS ON TYPE B-10 AEROPLANE

MACHINE GUN INSTALLATION ON TYPE PB-2 AEROPLANE

MACHINE GUN INSTALLATION ON TYPE A-17 AEROPLANE

been expanded from five classes of six members each.

A major factor in graduating qualified armament officers and aircraft armorers has been the establishment of scheduled field exercises initiated during the last school year. The Maxwell Field Bombing and Gunnery Base at Valpariso, Florida, was generously made available to this department for specific periods of which full advantage has been taken with great benefit not only to the students but to the instructional staff as well. The Regular Army Officers class is employed in field machine gunnery on latest types of airplanes for two weeks, followed at a later time by two weeks of bombing exercises, each officer performing not only the duty of pilot but also as armorer. Each enlisted class is scheduled for a two-weeks' period of bombing and gunnery combined. These field exercises constitute a most important phase of the course, employing the student in intensive practical work, actually handling live ammunition and high explosives, servicing the armament equipment of the most modern types of flying airplanes under service conditions, and applying class-room knowledge in actual field operations, with emphasis on trouble-shooting of all natural and contemplated malfunctions.



CLASS-ROOM INSTRUCTION ON BOMB RACKS

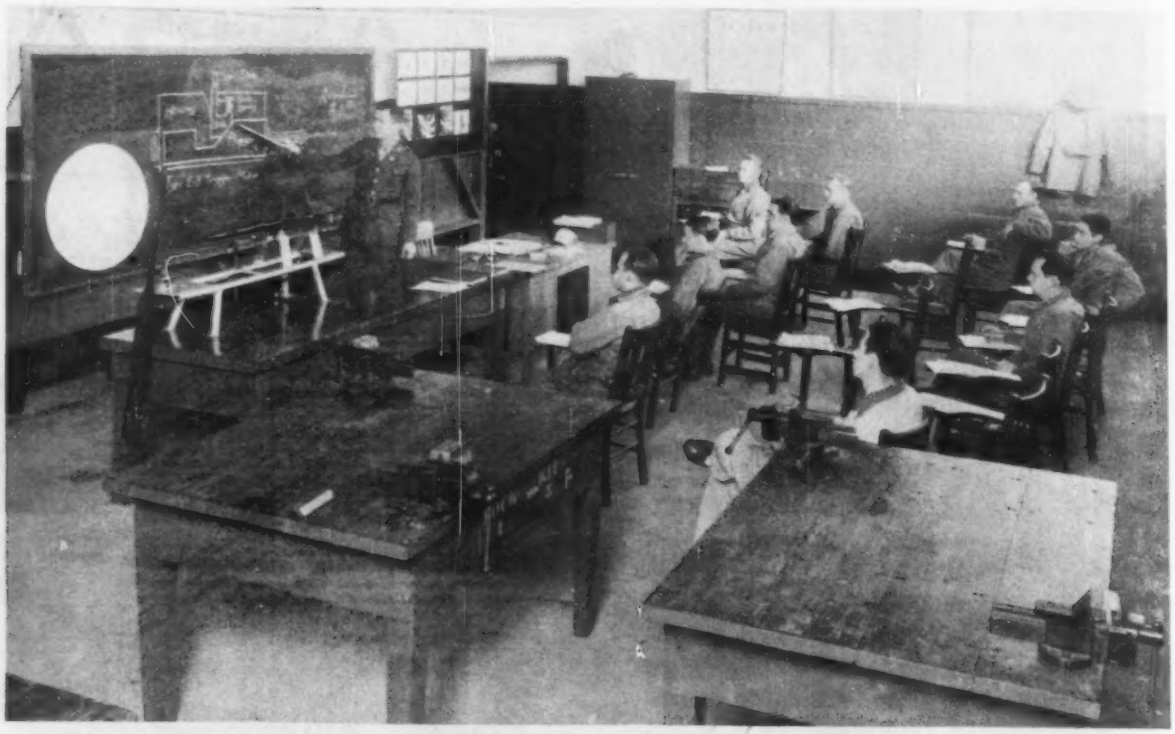
The result is the graduating of what may be considered stable, well-qualified, semi-experienced armament officers and armorers, far different from the previous armament graduate who, without the training in such field laboratory work, could have only his class-room instruction to qualify him, through lack of space and facilities in the vicinity of Chanute Field proper for training

with actual firing and bombing airplanes.

However, this arrangement for field training is only a poor substitute for field laboratory work that should be included in the Armament courses with range facilities adjacent to or close by the school itself. Conducting these exercises at a distance of 700 miles, field training has necessarily been for any one class conducted in a concentrated period, while for proper instruction the department should have those facilities next door, where field work could be performed daily in conjunction with classroom work, much the same as laboratory work in any college. When a range of this type is provided, as is expected at another location, the department will take a large step forward in unification of its instruction with direct results in the caliber of its graduates, together with expansion in classes.

The one outstanding law of the Department of Armament of the Air Corps Technical School is that a graduate, officer or enlisted man, must, before even being considered for graduation, demonstrate absolute reliability with reference to all phases of work with aircraft armament. The staff of the department is thoroughly inculcated with the principle that a poor engine mechanic or a poor airplane mechanic may cause failure of mechanical equipment resulting in fatalities, but that a poor armament mechanic is almost certainly to go farther in a consideration that he is not only responsible for proper operation of machinery but also the proper handling of high explosives.

Another basic principle of this department is to keep abreast of not only present but future or contemplated developments in aircraft armament and to obtain equip-



CLASS-ROOM INSTRUCTION ON SYNCHRONIZING MECHANISMS

ment and include instruction according to this principle in all phases of the subject, in order that the officer or enlisted graduate may go to his organization or new station equipped to function with not only the equipment used at that station upon his arrival, but also to be familiar with new equipment to be expected.

FUZING AND LOADING BOMBS ON A-17 AEROPLANE

CLASSROOM INSTRUCTION IN MACHINE GUNS

COMMUNICATIONS DEPARTMENT

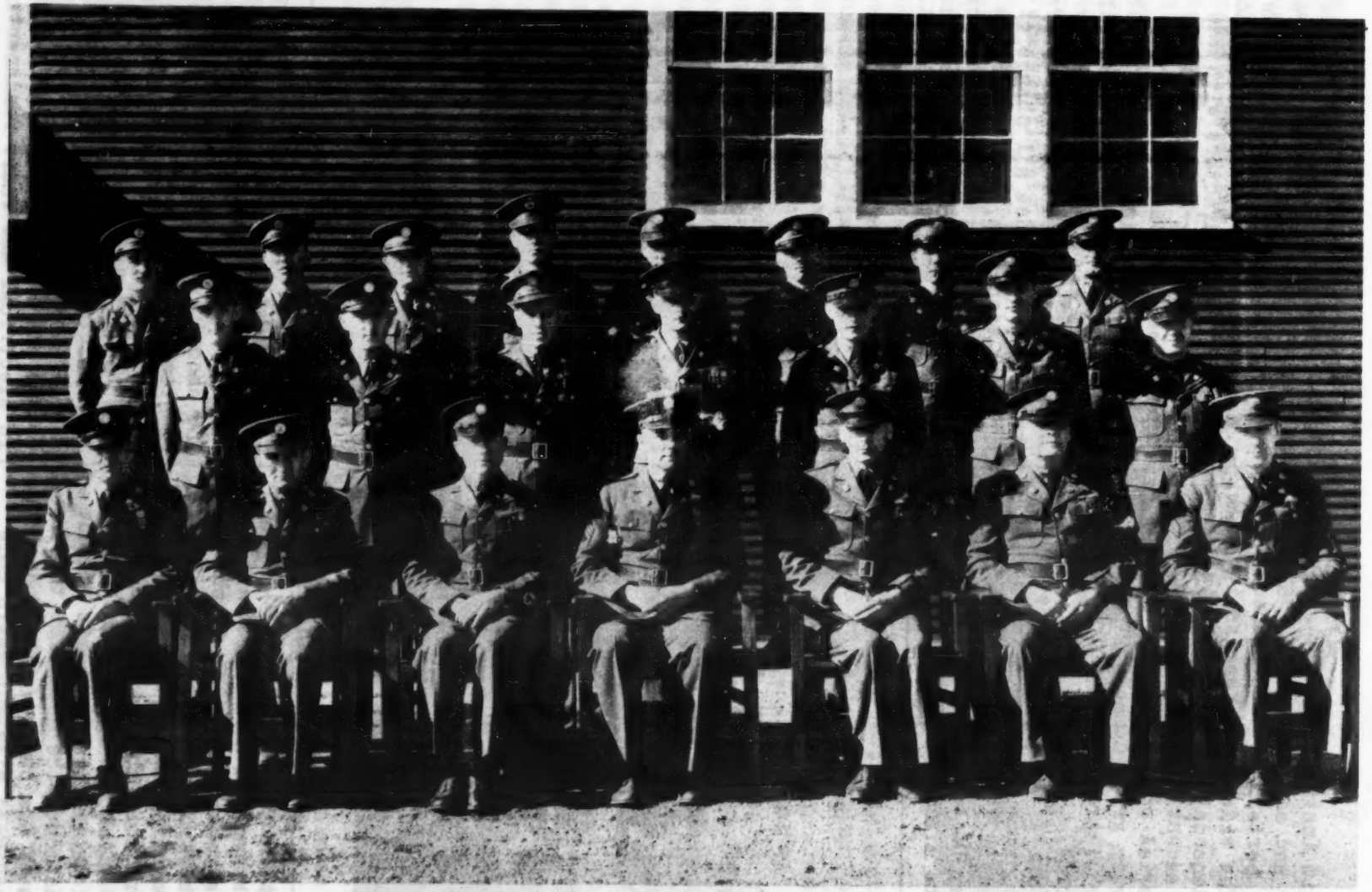
Capt. N. D. Frost
Director

Soon after the World War, plans were made for the training of Air Corps Communications personnel by the Air Corps. In 1919 the Air Corps Communications School was organized and placed into operation at Post Field, Fort Sill, Oklahoma. During the summer of 1922, the Air Corps Communications School was moved to Chanute Field, Rantoul, Illinois where it lost its identity as a separate school and became the Department of Communications, Air Corps Technical School.

The curriculums of both the officers and enlisted courses have been changed many times in an effort to keep abreast of the rapid technical progress in communications equipment employed by the Air Corps. In the school year allotted for the officers' course it is difficult to cover properly all the essential subjects. However, it should be remembered that the school is not trying to produce highly trained specialized engineers but rather to train officers for tactical assignments in Air Corps Communications. The twenty-eight weeks (for unassigned) and twenty-four weeks (for assigned) enlisted students are devoted to the training of combined radio operators - repairers in order that graduates may be qualified to act as radio operators aboard aircraft or at ground stations and to be able to perform all pre-flight, daily and maintenance inspections of radio equipment.

The curriculum may be roughly divided into three parts. Approximately one-third of the time is spent in the study of the fundamental and theoretical subjects such as electricity and magnetism, high frequency phenomena, vacuum tube characteristics, receiving circuits, transmitting circuits and antennae. One-third is devoted to Radio Operating involving transmission and reception of the international morse code, typewriting, and radio and teletype procedure. The other third is utilized for instruction on the circuit test and repair of radio equipment, the maintenance

1st Lt. C W Haas
Asst. Director



Enlisted Staff, Department of Communications.

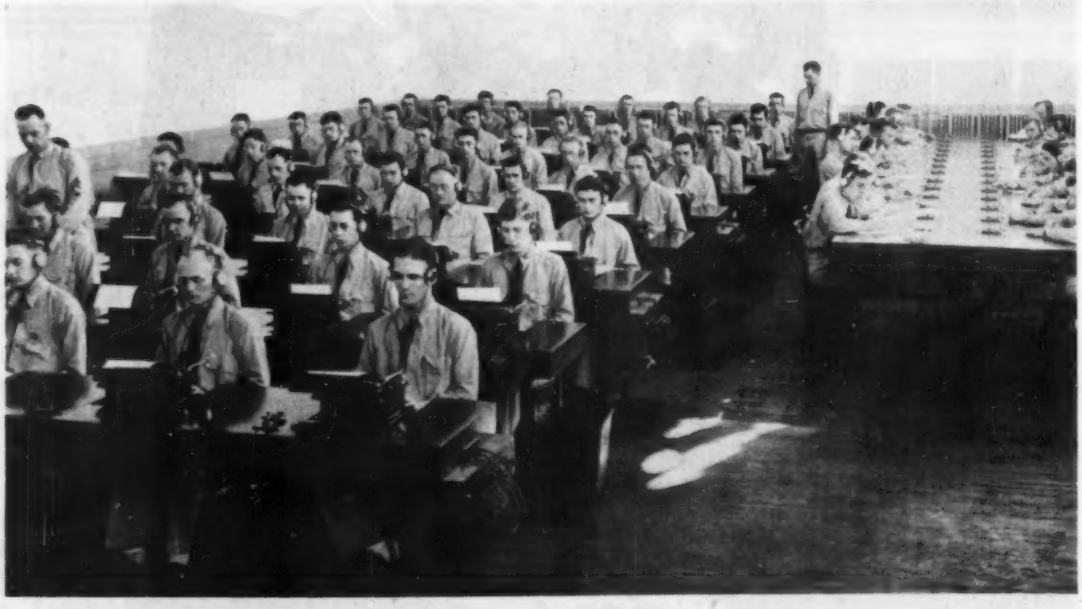
of radio installations and the supply and administrative regulations, pertaining to communications.

The widespread realization that dependable radio communication is an essential adjunct to successful aerial operations has resulted in a very great demand for a large number of trained communications personnel.

One of the first classes the embryo "communicator" attends is Typewriting; typewriters having Western Union keyboards are used and the minimum requirement is twenty words per minute using the touch system. Those students who are already proficient in the use of the typewriter when they enter school are excused from typing and attend code classes instead.

After the student has qualified in typing he attends code instruction twice daily for the duration of his course. The Code Room is equipped with automatic code machines of modern design, low and high frequency radio receivers, an Ediphone recorder for checking student transmitting ability, and an "ink recorder" for making permanent records on paper tape of each student's accuracy in forming code characters with the standard hand telegraph key and the Vibroplex semi-automatic key.

When the average student has obtained a code speed of approximately twelve words per minute he is ready for the subcourse called Radio Procedure; this subject includes all phases of operating technique, aside from the actual use of radio equipment, which the aircraft radio operator must know.



Students taking Code instruction.

Each student is required to develop an operating knowledge of the Joint Army and Navy Radio-telephone Procedure and the procedure in communicating with Department of Commerce radio facilities. After learning the principles of "message handling", the student applies them in practical exercises throughout the remainder of the course.

A brief but comprehensive course in electrical and radio fundamentals is given in the subcourse entitled Principles of Radio Communication.

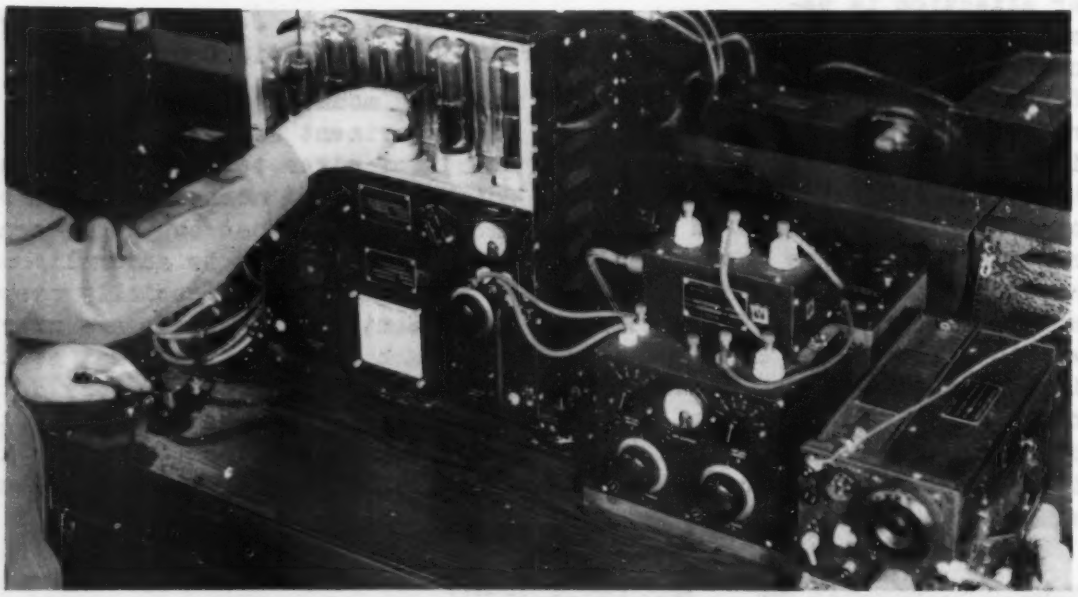
While theoretical in nature, this subject has been made highly practical through the careful selection of demonstration and individual laboratory experiments. For example, students undergoing instruction on radio transmitters perform experiments which demonstrate the principles involved in the Command and Liaison Set transmitters; particular attention is devoted to the proper tuning and adjustment of the circuits and correct interpretation of meter indications since experience has shown that these "theoretical" factors are of considerable importance in the practical use of the actual radio sets installed in aircraft. Cathode ray oscilloscopes are frequently used to make visible demonstrations of electric wave phenomena which formerly required the student to exercise considerable imagination. The equipment for individual laboratory experiments is permanently mounted on breadboards; with his experiment each student is given a supply of wires terminated in special quick-fastening connectors resembling glove snaps so that the more complicated hook-ups may be accomplished within a few minutes. Specially prepared experimental data sheets are provided with each experiment so that students may quickly record laboratory data and have sufficient time to write out the answers to questions devised to aid them in drawing logical conclusions. From the foregoing description it will readily be appreciated that the Department of Communications has far better lecture room and laboratory facilities than most colleges and universities.

Demonstration by Sgt. Jones, Instructor in Principles of Radio Communication

Pvt. Chamberlain, Student, performing experiment in Principles of Radio Communication.

An understanding of the electrical and radio fundamentals provides the student with a proper foundation upon which to build his practical knowledge of standard Air Corps radio equipment; this special knowledge is acquired in the subcourse called Circuit Test and Repair of Radio Sets. In this subject the student receives practical instruction on the operating

adjustments, circuit testing and applied principles of modern service radio equipment. The Circuit Test and Repair laboratory contains over fifty specially designed steel laboratory tables on which are mounted modern types of Command Sets, Liaison Sets, Radio Compasses, and Test Equipment; all power for the operation of aircraft radio equipment is obtained from a central power plant adjoining the laboratory room. Conspicuous by way of contrast is a row of ten aircraft radio transmitters, in vogue over ten years ago, which are employed in teaching the principles of transmitter trouble shooting. This is done by requiring the student to place designated troubles in the transmitters after which he records and analyzes the symptoms obtained. Although obsolete equipment is used in this phase of instruction, the principles involved are essentially the same as those embodied in modern equipment. Working with modern equipment the student is required to develop an intimate practical knowledge of the numerous adjustments essential in its intelligent operation and maintenance. The general objective in this subcourse is to develop in the student the ability to read and understand the Manufacturers' Handbooks of Instruction and Technical Orders pertraining to standard radio equipment, and intelligently to apply the directions contained therein. It is doubtful if a more complete and well designed laboratory for this kind of important instruction could be found anywhere.

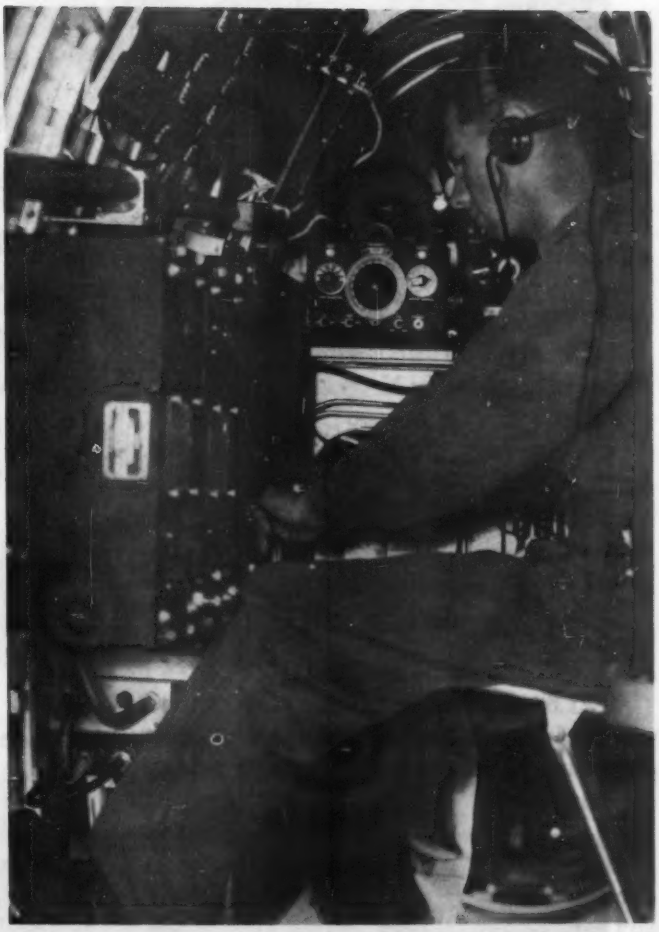


Student Bench Testing Airplane Radio Set.

Field telephony is employed by the Air Corps to a limited extent, generally during maneuver periods; consequently the instruction given in wire communication equipment is rather limited. During the time allotted, the student receives instruction in the installation, operation and field maintenance of field telephones and switchboards. Following instruction and practice in the installation of simple field wire systems, the student receives a small

amount of training in field trouble shooting methods. The principles of wire telephony are also embodied in aircraft interphone equipment, a thorough knowledge of which is essential to aircraft radio men.

The final phase of the course is devoted to thorough instruction highly practical in nature on cord and plug assembly and on the Inspection and Maintenance of Radio Installations. The ability to handle skillfully a soldering iron is almost as important to aircraft radio men as the ability to handle radio messages. In this subcourse students receive expert instruction in the care and use of soldering irons and the few hand tools associated with the radio repairman's work. Practical jobs assigned on this phase of instruction include radio cord and plug assembly. In connection with instruction on the Maintenance of Radio Installations the student is taught how to install and service aircraft antenna installations, how to "bench test" radio equipment prior to placing it into service on aircraft, how to perform the prescribed inspections of aircraft radio installations, and how to use a systematic method of locating troubles in the installations. Special lectures are given explaining the Air Corps Technical Order system, the Air Corps Circular system and the Signal Corps Supply Letter system; the student is required to look up references in these files throughout his work in this phase of instruction. The student is also taught how to read an airplane electrical wiring diagram, since some of the wires of the airplane communication system are included in the same conduits as other portions of the airplane electrical system. When aircraft are available, students are given actual operating practice in flight. The instruction on Ground Radio Installations includes field exercises involving the operation of radio nets including two way communication between airplanes in flight and ground stations. In every respect, this subcourse is the most practical and most valuable in the entire communications course; it may be likened to the keystone of an arch, and being so, it requires the firm foundation supplied by the various other courses which are prerequisite to it.



Pvt. Norman, Student, making Inspection of Radio Equipment installed in Bomber, Type B-10.

Pvt. Robinson operating a Receiver of Squadron Ground Set.

Pvt. Michael repairing Cord & Plug Assembly for Airplane Radio Set.

The Department of Communications has adopted as standard for all examinations the so-called "New Type" examination questions; examinations of this type often include over a hundred questions, yet their design is such that they can be completed by the average student in from twenty-five to thirty minutes. The examinations may be graded in a few minutes through the use of specially designed answer keys, the use of which insures a standard basis for the grading of all examinations since there can be no doubt as to the "degree of correctness" of any question; instructor opinion is thus eliminated in the grading of examinations and the grade awarded a given paper will be the same regardless of who grades it. By making the examination comprehensive in scope, each instructor can obtain a reasonably accurate measure of the knowledge possessed by his students, since error due to chance selection of questions are virtually eliminated. When a sufficient number of students have taken each examination, the Training Literature Section conducts elaborate statistical investigations for the purpose of eliminating poorly designed questions and determining the degree of difficulty of the remaining questions. By this process, subsequent revisions of examinations are subject to continuous improvement as the amount of statistical data accumulates. In practice, the use of the New Type, comprehensive examinations has met with universal favor by both instructors and students since considerable time is saved by all concerned.

1st Lt. G.A.Blake
Asst.Director

Many of the graduates of the communications course will report to their organizations to become aircraft radio operators aboard modern bombardment airplanes. Their responsibilities are akin to those of radio operators aboard seagoing vessels and they will become more so as military aviation develops and progresses. It does not require much imagination to conceive of situations where the radio operators will be directly responsible for the safety of the airplane on which he is flying and its crew; in such situations the level headed, resourceful operator of high technical qualifications will perform a service of much greater value than the cost of his training at the Air Corps Technical School.

With the almost continuous expansion of communications facilities within the Air Corps from both an airplane and ground standpoint an interesting and worth while career is practically assured for those who follow up this specialty. At the present time the Air Corps as a whole has a need for approximately a thousand more trained communication specialists above the normal yearly attrition.

Untrained men of the Air Corps and those planning an enlistment in the Air Corps are urged to investigate the possibility of becoming enrolled for the radio operators - repairers' course of the Air Corps Technical School, thus assuring an interesting career.

THE DEPARTMENT OF PHOTOGRAPHY

Major Donald G. Stitt, A. C.,
Director.

Captain Donald W. Norwood, A.C.,
Assistant Director.

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The Department of Photography of the Air Corps Technical School is charged with giving photographic training to such officers and enlisted men of the Air Corps and National Guard as may be designated by the Chief of the Air Corps.

The training given in this course is so planned as to provide a balance between practical work and theory so that the graduate will not only be able to accomplish the photographic duties assigned to him, but will know the reasons behind every operation he performs. For example, in outdoor photography, he will not only use the correct filter when photographing any given scene, but he will know just what the effect of that filter will be for that particular scene on the type of film being used. In the laboratory he will not only know standard time of development for any given type of film, but will also know under what conditions that standard time of development should be modified in order to produce best results. And so on with every function performed.

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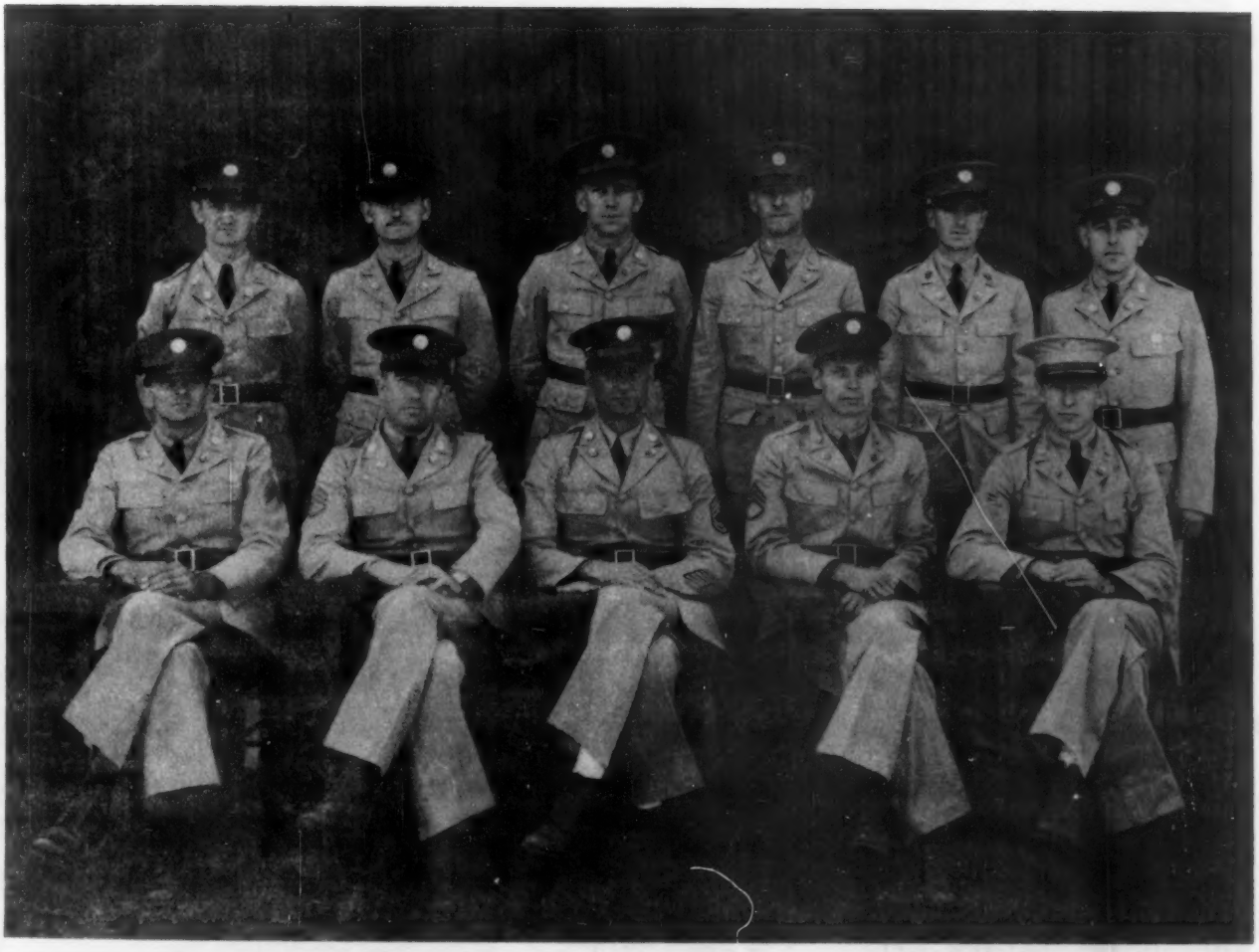

Enlisted Instructors

Top Row: Pvt.AM2c1 John J. Williams; Instr. Mosaic & Mapping; Pvt. Chas. T. Forsyth, Instr. Aerial Photo Division; Pvt.AM2c1 Norbert Danko, Instr., Preparatory Division; Corp.AM1c1 Lehr Cochran, Instr. Mosaic & Mapping; PFC Charles G. Wilcox, Instr. Ground Photography Division; Pvt.AM2c1 John Koelbl, Instr., Aerial Photo Division.

Bottom Row: Sgt.AM2c1 John A. Hancock, Instr. Preparatory Division; St.Sgt. Herbert Spees, Instr. Mosaic & Mapping; Tech.Sgt. Arthur Stolte, Instr. Aerial Photo Division, Camera Repair and Maintenance; St.Sgt. Robert H. Spencer, Instr. Ground Photography Division; Pvt.AM1c1 Leonard E. Wine, Instr. Aerial Photo Division and Camera Repair;

ELEMENTARY DIVISION

The Photographic School has four main divisions. The student goes through these progressively, going first into Elementary Photography where he is taught the Fundamentals of Photography, Elementary Photographic Chemistry, Photographic Optics, Negative Making and Printing.

While this division and the one which follows do not deal strictly with aerial photography, great stress is placed on the necessity for careful instruction in the basic principles of photography, a thorough knowledge of which is essential in enabling the student to analyze the problems which he will encounter later on.

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GROUND PHOTOGRAPHIC DIVISION

Upon successful completion of the first phase, the student goes to Ground Photography where instruction on Ground Cameras and their use is offered. In this division the student not only operates the camera but carries through with the negative processing and printing. The result of his efforts being a finished picture of the object or scene designated. The picture assignments in this division are many and varied including exterior and interior views, flash lights and time exposures, airplanes and airplane parts, catalog illustrations and portraits. Artistic composition is stressed in this work. The assignments are planned with a view to making the student completely familiar with the operation of ground cameras under a wide variety of conditions. The

Pvt. Wooles: "This aerial camera was as easy to take apart as my first watch".

Pvt. Taylor, instructor, shows Pvt. Johnson the fine points of using a Pantograph.

Pvt. Arnold tries his hand at mixing a developer solution.

laboratory work given in this division further develops the student's knowledge and skill in photographic processing.

AERIAL PHOTOGRAPHIC DIVISION

Master Sgt. Grover B. Gilbert, A.C., Senior Instructor.

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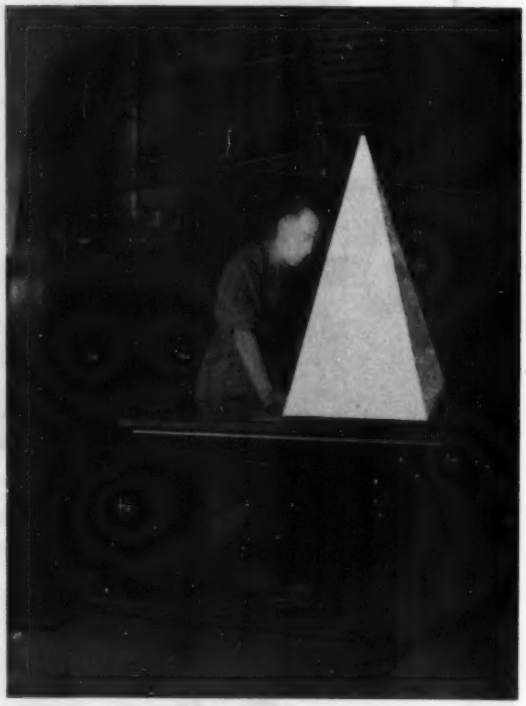
The third division is Aerial Photography. In this division the student learns the maintenance and operation of aerial cameras and associated equipment and the processing of aerial camera film. Practice in the operation of the camera in the air with different types of missions such as oblique, pin-point and mosaic is given. Aerial Cinematography, in which the theory of motion picture is studied and practical work in taking of aerial movies and subsequent development of film is covered in this division.

MOSAIC AND MAPPING DIVISION

In the fourth Division the student receives instruction in Mosaic and Map making. Here he is given the theory underlying the making of maps; various projections of the



Pvt. Koelbl tries making "big ones" out of "little ones."

earth's surface and the features of each; military grids; control points on the earth's surface; geographic coordinates, etc. A projection of a small portion of the earth's surface is constructed by each student, control points in the area plotted, and then a mosaic, consisting of prints made from an aerial negative, which the student has made is laid, gridded, titled and copied. This work is of great importance in the Air Corps and, consequently, considerable time is devoted to it in the course.

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The foregoing is just a brief sketch of the work that is given in the Photographic School and makes no attempt to cover in detail all the many and varied subjects that are brought together under the heading of Photography and must be mastered by any one who aspires to be an expert photographer.

It is the objective of the Photographic Department to turn as many of the students detailed as possible into graduate photographic experts. This can be done only by cooperation on the part of the student in studying and working hard after he gets here, and cooperation on the part of the organization commanders throughout the service in recommending for detail to the school only those men who have demonstrated that they have the requisite qualifications.

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Pvt. Tomaso says "Before I got into Ground Photography, I thought Photography consisted of taking a picture of your girl and turning the film in to the corner Drug Store."

DEPARTMENT FOR INSTRUCTION OF AIR CORPS SUPPLY AND TECHNICAL CLERKS

1st Lieut. William P. Sloan, A.C., Director.

Competent, well-trained clerks possessing initiative, administrative ability, and a high standard of efficiency, in addition to a specialized knowledge of the particular clerical duties assigned them, are needed and especially desired in the Air Corps. Fully realizing the urgent need for such clerks--as much so as for skilled mechanics, radio operators, machinists, photographers, and other technicians--the Department for Instruction of Air Corps Supply and Technical Clerks was organized in 1933, and equipped with the most modern office equipment available. As the result of organizing this Department many men, who had some limited clerical training upon entering the service and were thereafter assigned clerical duties, have been afforded the opportunity to be detailed to a course of instruction arranged and specialized to "round out" their earlier training, thereby fitting them for more efficient performance and accomplishment of their duties, as well as increasing their value to the service. Likewise, men who have had no clerical training, but believe they possess the ability, capacity and educational qualifications necessary for a clerk are given the opportunity to enter the course. The value of these graduates is readily recognized by their organizations and departments, with advancement and promotion awarded accordingly.

The main objective of the course is to train Supply-Stenographers and Operations and Engineering Clerks. However, a graduate is also capable of easily becoming acquainted with office routine and can thus perform duties as an excellent clerk in any office other than those for which the course specializes him.

This special issue of the AIR CORPS NEWS LETTER, by the Air Corps Technical School, serves as a medium to give to the service the following general infomation on the curriculum, methods and scope of instruction:

The duration of the course is twenty weeks. Twenty students are trained in a class. Two classes are trained during the school year; the first class commencing on the first Monday in September and the second the first Monday in February.

All students are required to take General Instruction, upon completion of which those students who have shown the

greatest aptitude for stenographic work, up to one-third of the class, are thereafter trained as Supply-Stenographers, and the remainder as Operation-Engineering clerks.

GENERAL INSTRUCTION. (4 weeks - 140 hours) Typewriting, military and technical phraseology, shorthand, adding and calculating machines, business arithmetic, and Air Corps circulars and technical publications.

SUPPLY-STENOGRAPHER. (16 weeks - 560 hours) Military correspondence, Burroughs bookkeeping machines, business English, supply, typewriting, shorthand and organization.

ENGINEERING-OPERATIONS. (16 weeks - 560 hours) Military correspondence, calculating machines, business English, engineering, operations, typewriting, Air Corps publications and organization.

The method of instruction used in teaching Air Corps supply consists of a continuous series of practical problems that cover the initial equipping of tactical squadrons, posts and stations, and the maintenance thereof with supplies. This includes the requisitioning of supplies and equipment from Tables of Organization, Tables of Basic Allowances, and the use of Air Corps Stock Lists and Catalogs. These requisitions are followed through their source of supply, that is, the Station Air Corps Supply, the Control Depot, the Materiel Division, and, in necessary cases, to local purchases and contractors. In turn, these supplies are followed from the sources of supply to the source of issue and consumption. This procedure applies to both expendable and non-expendable equipment and supplies. These practical problems are accomplished on all the necessary and authorized forms.

Instruction in Engineering and Operations, like that in Air Corps Supply, is based on a series of practical problems, starting with Air Corps Form No. 1, which includes flying problems designated by Operations Orders, Field Orders and schedules of training. These problems are followed through by accomplishing the necessary authorized forms in making a record of aircraft and individual personnel flying time. The above problems are based on all different types of aircraft, in order to cover all types of flying problems, which in turn are followed through the various offices, in other words, from a squadron up to and including the functions of Wing and Post Engineering and Operations Offices.

The subject of military and technical phraseology is for the purpose of learning terms commonly used throughout the Air Corps and the proper use thereof. These terms include those pertinent to Aeronautics, Armament, Chemical Warfare, Electricity and Radio, Office Supplies and Equipment, and Photography. In addition to the technical terms, commonly misspelled, misused and incorrectly pronounced words are given in groups of one hundred each day. Following sufficient time for study, written recitation is given daily. This phase is for the purpose of preparing for the allied subject of Military Correspondence, in which the instruction adheres to regulations governing the preparation of military letters, indorsements, memorandums, telegrams, radiograms, orders, etc. Practice work in the different types of military communications is given, following completion of the manual thereon. In this practice work, much emphasis is given to maintaining strict compliance with the prescribed arrangement of matter in the communication and also included are exercises designed to develop excellence

in the composition of the various forms of communication, particularly military letters. Particular emphasis is placed on spelling and phrasing in the composition, and neatness of the completed copy. The knowledge acquired in business English, which has been completed when the student reaches this phase of instruction, has been found very useful and helpful. Classes in military correspondence are conducted one period a day for sixteen weeks, and have been found very interesting and instructive to one who is familiar with correspondence, as well as one who contacts it for the first time while at this school.

the final decision or accomplishment. The text is prepared for the purpose of presenting, in convenient form, the announced policies and basic principles of military organization. It gives a brief outline of the general organization of the land forces of the United States, including a theatre of war. It presents in considerable more detail the organization of the General Headquarters Air Force, the Office, Chief of the Air Corps, and the Materiel Division.

The Burroughs Bookkeeping machine, our most costly item of equipment, is an interesting phase of instruction. The student is impressed and interest maintained by the mathematical problems performed by slight

"Gadget and Dodad" end of a Burroughs Billing Machine

Organization of the Army is taught with the thought in mind that a student understanding the size and functions of the various units in the organization can visualize the routine routing of correspondence and accomplished forms from the offices originating them to the office making

pressure applied to keys and bars which control the various registers. Proficient typing is an asset toward developing a skilled operator. Practical work is given on all forms used in supply, which are accomplished by the bookkeeping machine. Upon completion of bookkeeping machine instruction, students are qualified in

maintaining an Air Corps Stock Record account, which includes the intricate posting of credits and debits, and the recording of receipts and issues. In this phase of the course, practical exercises are given in the operation and use of the Burroughs Adding Machine and Monroe Calculator.

The keys are blank, so the "Hunt and Peck" system will not work here.

A system of shorthand easy to learn, read and write, and excellent in speed possibilities, namely Gregg, is taught. The elementary phase is varied by use of a shorthand reader, blackboard drills and shorthand penmanship. Dictation material in advanced shorthand represents a technical and business vocabulary. The importance of an accurate transcript is stressed and, accordingly, graded very closely for faulty transcription, spelling and punctuation. Success in this subject is dependent on the ability to instantly apply principles and rules in practical applied work. Completion of this phase renders the clerk capable of taking dictation at an average rate of speed, and opportunity is thereby afforded for acquiring further shorthand skill.

Typewriting is taught by the touch system. This means typing without looking at the keyboard, which is blanked. The blank keyboard tends to motivate the three essentials necessary to skilled typing, that is, accuracy, coordination and rhythm, as soon as training begins. Definite practical exercises in letter forms, telegrams, radiograms, manuscripts, bills, invoices, tables and statistical matter, and legal and business documents are accomplished, which create interest while operative skill is being mastered. This work is arranged and compiled in budget form. In advanced typewriting, each student is trained on Underwood, L. C. Smith, Royal, Remington and Woodstock typewriters, thus becoming familiar with the majority of standard types in use in the service. In the same phase, periodic tests are given to determine typing speed. A graduate should average forty to fifty words per minute, his exact typing speed having been ascertained by use of the International Typing

Rules, or the same rules used to judge professional typing experts.

Much stress is placed on the knowledge required of a clerk to correctly interpret instructions contained in Air Corps Circulars and technical publications. In this subject, the student must maintain a complete set of files on publications used in accomplishing his instruction, and, as a result, he not only learns to file these publications, but gains the practical experience necessary in keeping them posted to date. When this phase is completed, the majority of Air Corps Technical clerical work can be accomplished with little or no supervision, or on the clerk's initiative, which has been developed to a marked degree during the course.

In conclusion, the Department for Instruction of Air Corps Supply and Technical Clerks makes every effort to furnish the service an efficient and well-qualified clerk.

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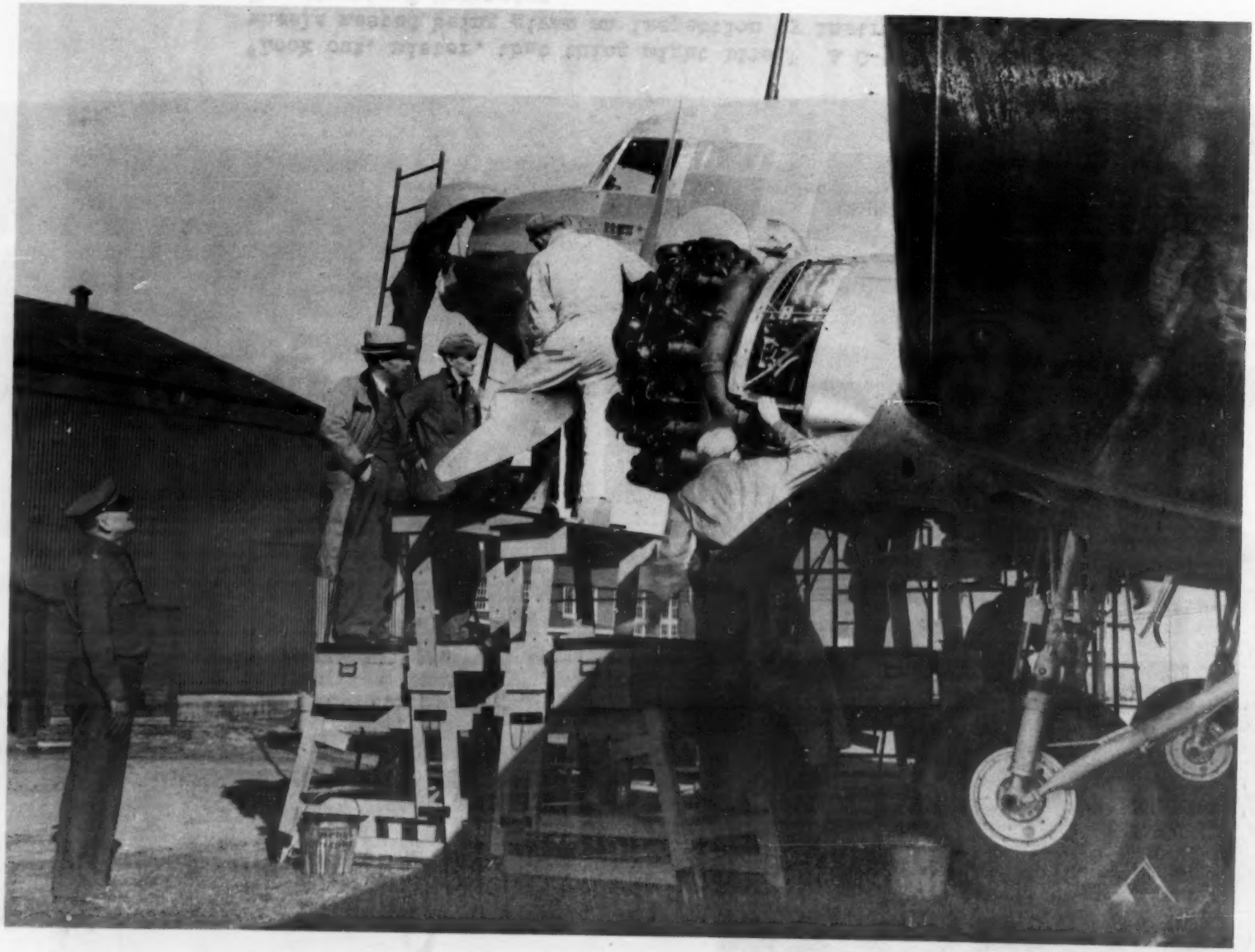
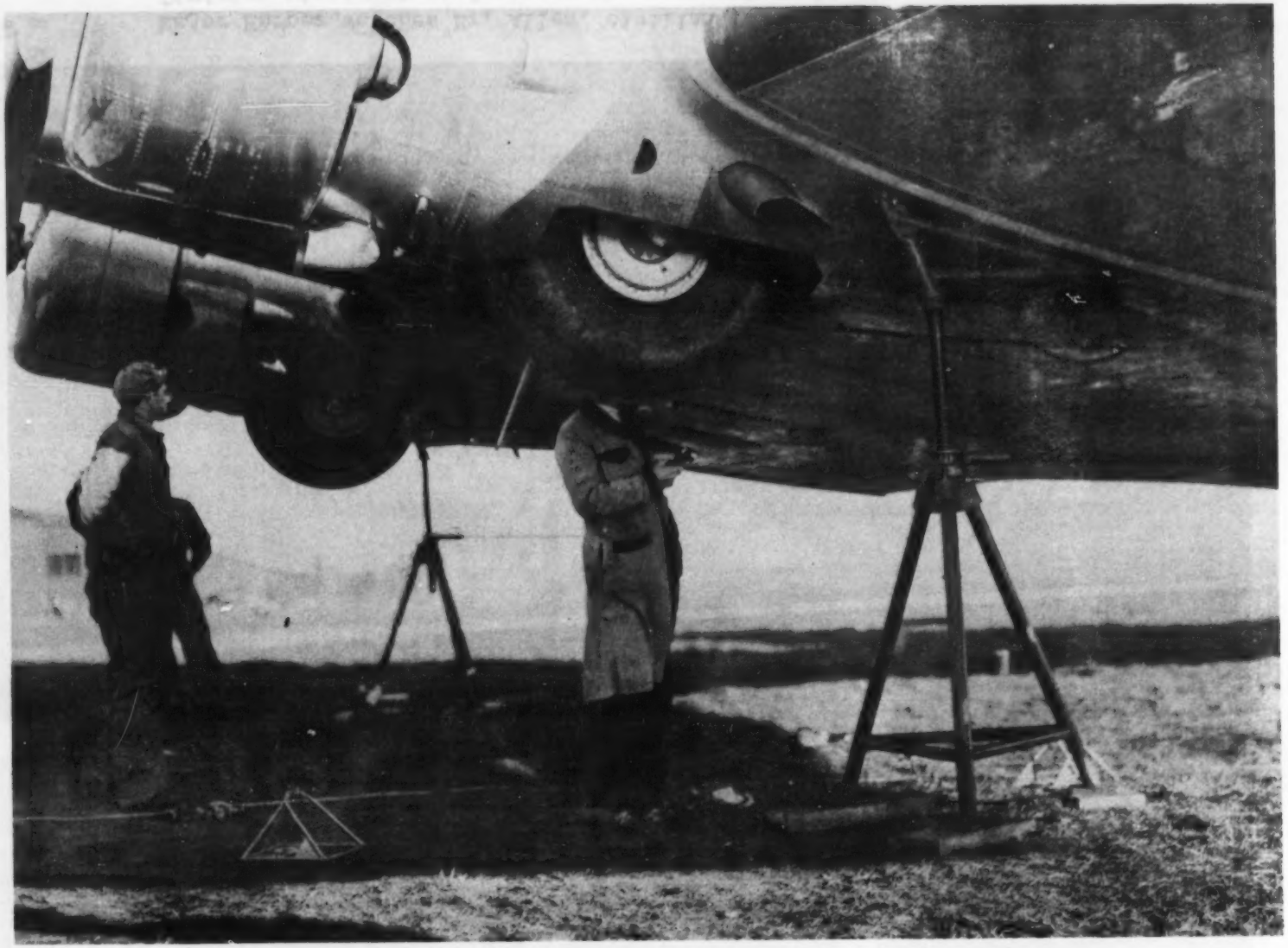
Enlisted Instructors

S.Sgt. E.L. Pond, Instr. Organization, Engineering, Operations, Supply and General Technical Administration; Sgt. R.C. Pierce, Instr. Office Machines and Supply; S.Sgt. K.S. Brown, Instr. Business English, Business Arithmetic, Military Correspondence.



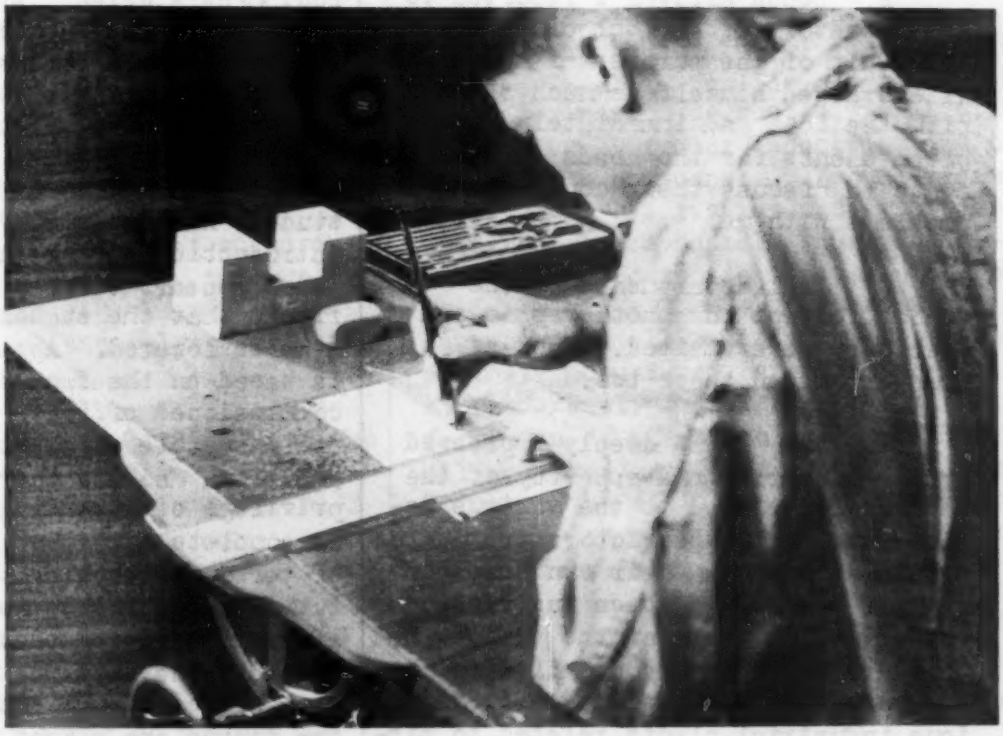
Major Harper watches Mr. Allen, civilian instructor, Propeller Division, instruct students on the proper installation of a propeller on the C-33.



"Look out, mister, that thing might bite!" A C-33 on jacks with wheels nested being given an inspection by instructors of the Department of Mechanics.

One officer and eight enlisted men of the Philippine Army are now attending courses at the Air Corps Technical School. The picture below shows one man working in Mechanical Drawing Course, Department of Basic Instruction.

"Now if I look at it this way", says Sgt. M. Alvarillo of the Philippine Army . . .



. . . "It should look like this on paper".

WHAT A MEMBER OF THE GHQ AIR FORCE STAFF THINKS ABOUT THE AIR CORPS TECHNICAL SCHOOL.

"Langley Field, Va.,
June 2, 1937.

Subject: Report of Visit to the Air Corps Technical School.

To: Commanding Officer, 2nd Bombardment Group, GHQ Air Force, Langley Field, Va.

1. On May 19, 1937, in accordance with authority contained in 2nd Indorsement, Hq. 2d Wing, GHQ Air Force, April 27, 1937, to letter, file 121.2 (3-19-37), Hq. 2d Bombardment Group, GHQ Air Force, subject: "Per Diem Orders", March 19, 1937, I proceeded to Chanute Field, for the purpose of visiting the Air Corps Technical School.

2. Upon arrival I reported to the Secretary of the School and advised him of the purpose of my visit. He expressed himself as much pleased with the idea and immediately made arrangements for the heads of departments to discuss their courses and problems with me.

3. All departments of the school, except the photographic and clerical, were visited. Lack of time precluded these two.

4. a. I was deeply impressed by the sincerity and capacity of the personnel assigned to the various departments. The instructors are men of proven ability in their own lines, many of them having been instructing from 15 to 20 years at the school. They are periodically detailed to duty to the Materiel Division and to various industrial plants related to aircraft and aircraft accessory development and manufacture, in order that they may keep abreast of the most modern equipment.

b. The equipment of the school is splendid, although some of the latest equipment (auto-syne instruments and automatic pilot in particular) were not yet available. Of especial interest was the setup for instruction in propellers and instruments. The Communications department has combined the best principles of civilian schools and the Army Signal School with the particular needs of the Air Corps to the end that their equipment is used to maximum capacity throughout the school year. The Armament section is thoroughly furnished with modern equipment even to include the latest bomb sight developments and the new M-2 .50 caliber machine gun.

c. Methods of instruction are thoroughly modern. The time devoted to theory is sufficient to enable the student to understand the "why" of the technical equipment studied. With this background the student progresses intelligently to the practical problems of the service and is thoroughly instructed by the applicatory method with splendid results.

d. The caliber of the enlisted student has materially improved since the introduction of the entrance examination. There appears to be a demand by some officers that the standard entrance requirement be lowered. Apparently this demand is based on the fact that many non-commissioned officers and Air Mechanics are incapable of passing the standard examination and are therefore denied the privilege of attending the school. I am in complete agreement that this class of personnel should attend the school, but I am convinced, more than ever before, after this visit, that unless a soldier can meet the entrance requirement that his chances of satisfactorily completing the course are slight indeed. Obviously the answer is, then, that all classes of

personnel prepare themselves for the examination, rather than lower the standards. There is at present in this Group one Corporal, Air Mechanic, who failed to complete the course at the school. The question arises, therefore, as to whether the requirements for the Air Mechanic rating are sufficiently high? Certainly, at first consideration, these requirements do not meet the standards of the Technical School. Further inquiry into this question by higher authority might be of value to the service.

e. Closely related to the above is the problem of selection of students. Rare indeed is the man with two or more enlistments who applies for a course at the school. This class of personnel is much more desirable than the recruit who so avidly applies. Inquiry into the reasons for the failure of older men to apply for the school is certainly in order and were discussed with the officers at the school. Careful consideration of this problem for the past four years and the discussion referred to above throws some light on the matter, and the probable causes follows:

(1) Lack of knowledge by squadron commanders of the aims and accomplishments of the school.

(2) Tendency of squadron commanders (still existing in some units) to send to school men who do not readily adapt themselves to duty in the squadron.

(3) Failure of squadron commanders to impress on their men the necessity for high caliber technical training, if they are to successfully make the service their career.

(4) Hostility of squadron commanders toward "sparing" men of some ability who can perform duty in the organization.

(5) Feeling among enlisted men that their opportunities for promotion will suffer duing the period of their detached service. (A feeling that is probably justified).

(6) The knowledge among the men that they can qualify for the rating of Air Mechanic without taking the course.

(7) Loss of flying pay while attending the school.

(8) Heavy expenses involved in the case of married enlisted men.

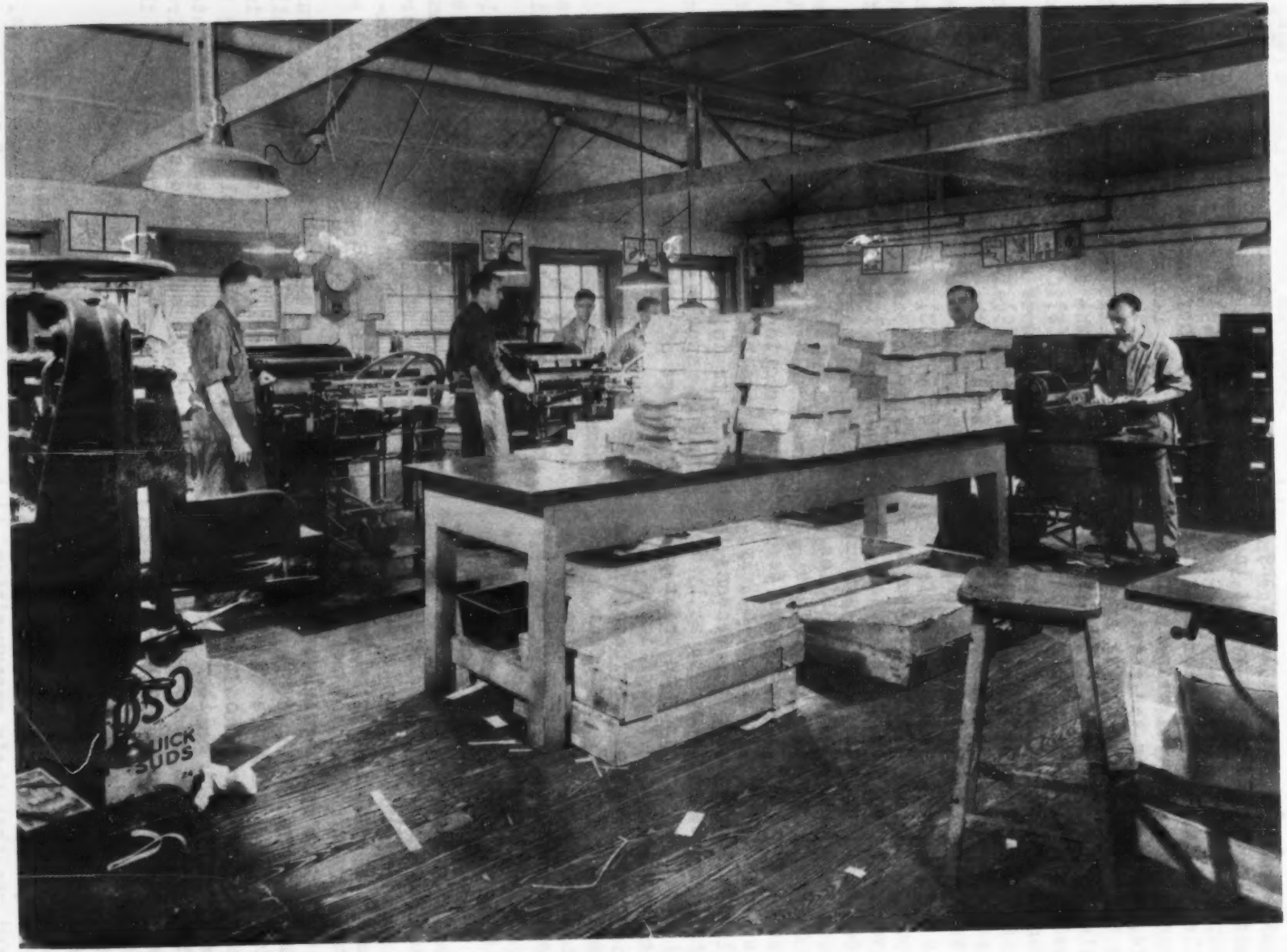
(9) Deplorable housing conditions at the school. (Double deck beds are in use in war-time buildings.)

(10) The above discussed inability to pass the entrance examination or fear of loss of grade or rating if they fail to pass.

(11) Among older men in the grade of Staff and Technical Sergeant, the practical certainty of promotion to the next higher grade without the technical training that would make them really capable of meeting the responsibilities of those grades.

There may be other reasons than those listed above, but so far they do not present themselves. It should be pointed out that only (9) above requires Congressional action for correction. The remainder may be corrected with little difficulty by proper indoctrination of responsible personnel. I would recommend, first, that all station and group personnel officers and all squadron commanders be ordered to the technical school to familiarize themselves therewith; second, that all enlisted men be assured of their normal pay and promotion while at the school; third, that detailed information of the school be available to all enlisted men. (The excellent catalogue of the school meets this requirement and is available for .25¢ from the School Secretary.)

(Signed) John H. McCormick,
Captain, Air Corps,
S-1"



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